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THE MAGAZINE FOR INFORMATION EXECUTIVES

MAY 15, 1997

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HANDS OFF My Data!

What will you do when
your customers
raise a fuss?

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The Payback From Shared Services

PAGE 48

Book Excerpt: Information Ecology

By Tom Davenport.

PAGE 88

This consumer
knows the value
of his personal
information



SPANS TWO CONTINENTS.

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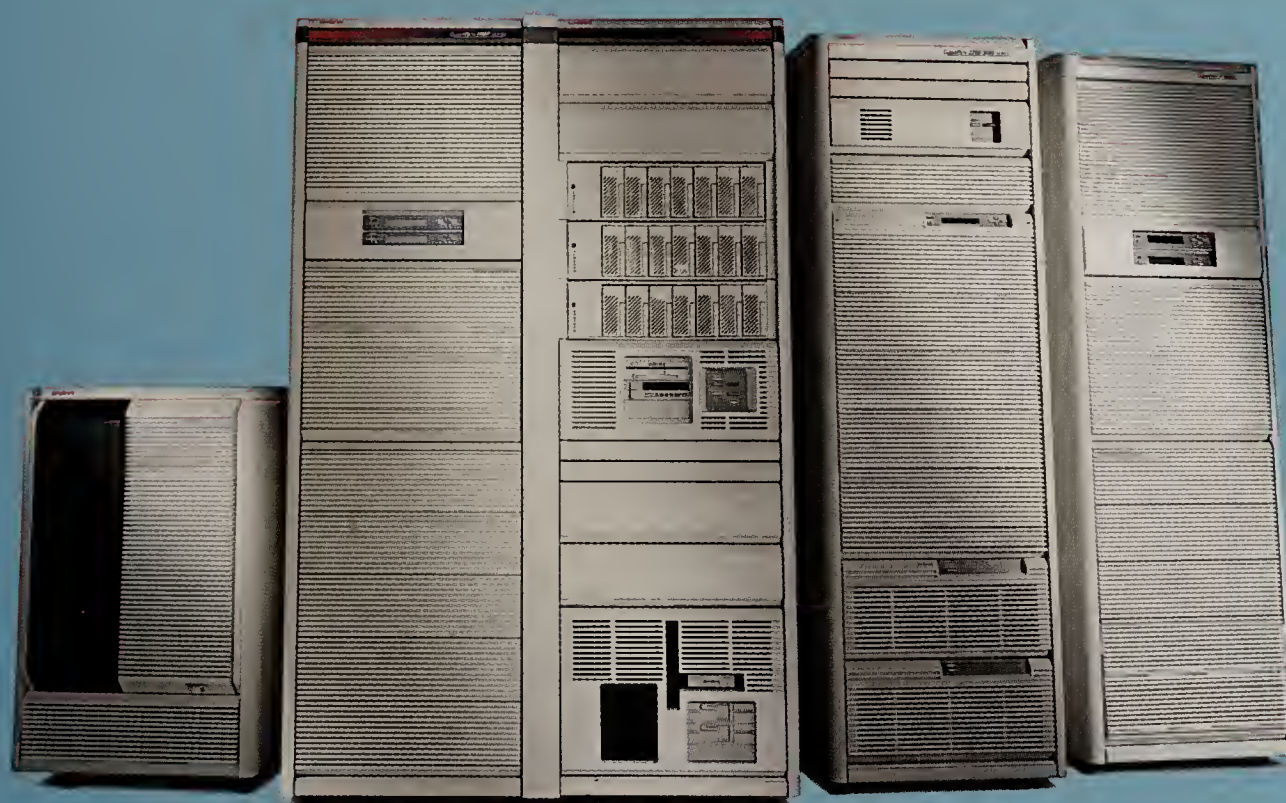
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Inside CIO

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Cover photo by John Soares



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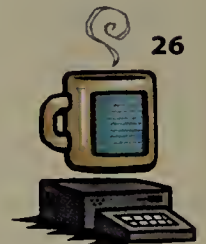
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Unicenter TNG Is The Smartest Way To Manage Any Network.

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VP Lehman Brothers



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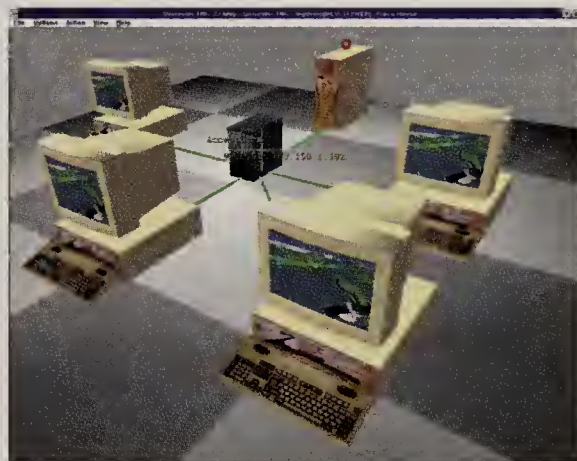
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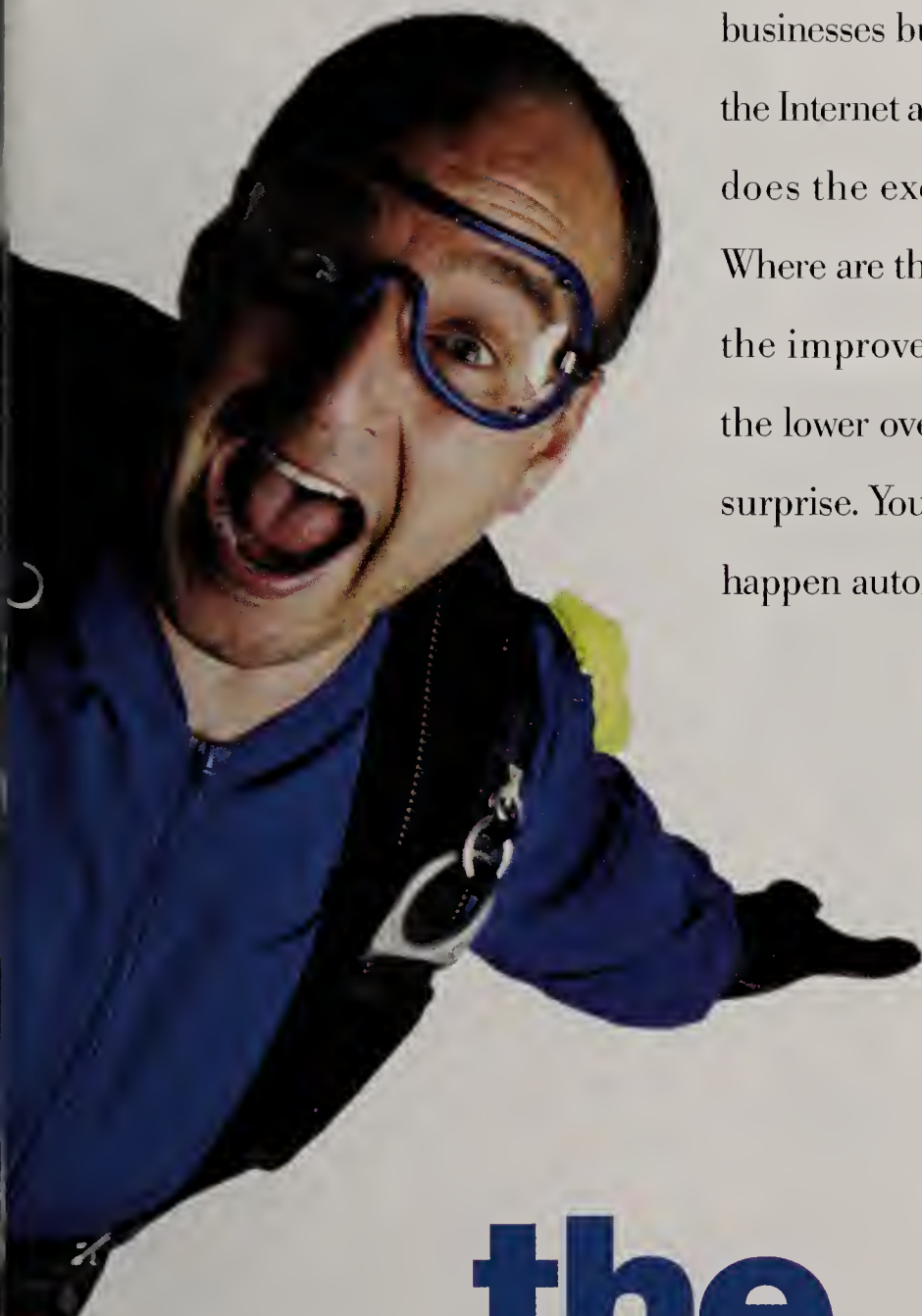
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the
“yipppee,
were on the
Internet!
now what?”
solution

Inside CIO

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The experiences of two CIOs suggest strategies the newly hired can pursue to keep the bloom on the rose.

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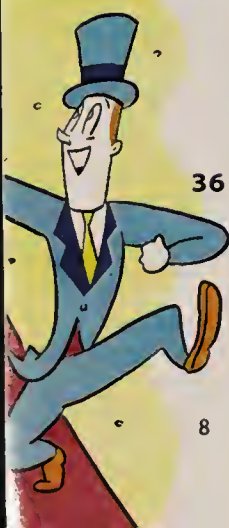
INTERNET POLICY

Catch a sneak peek of the **CIO study** "Maximizing the Internet: Policies, Procedures & Best Practices," which focuses on understanding the policy choices companies are making regarding the Internet.

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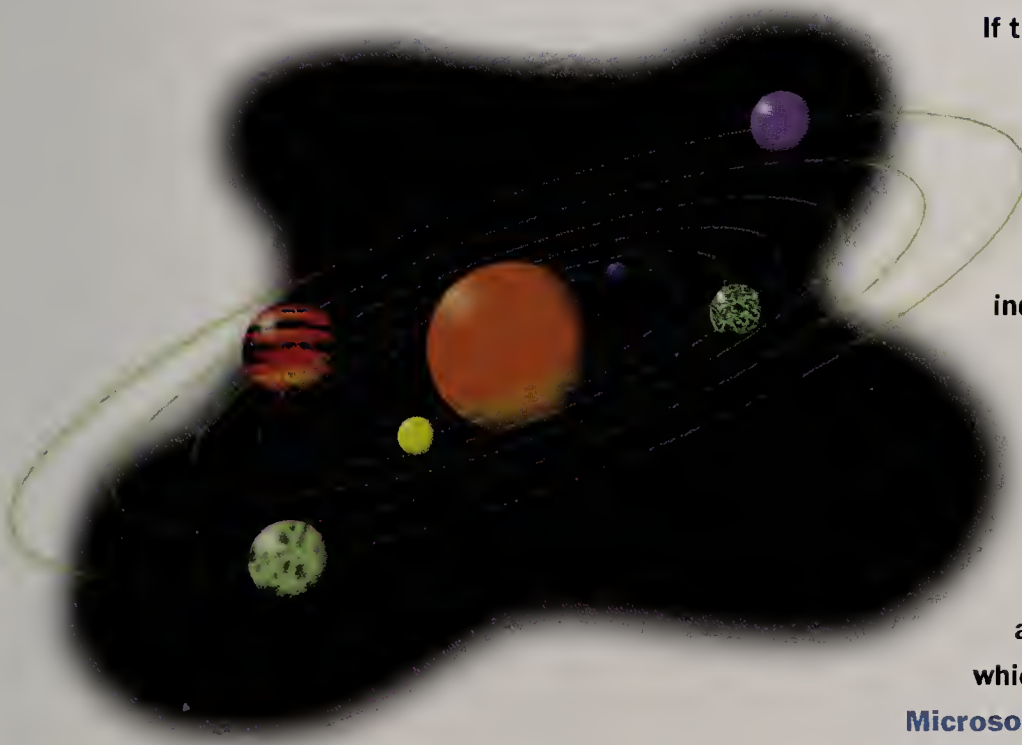


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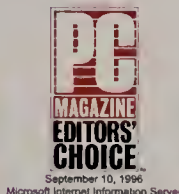
Microsoft Internet Information Server

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as the **best**
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on the **planet.**

*(Now you know where to go next time
someone says "take me to your leader.")*



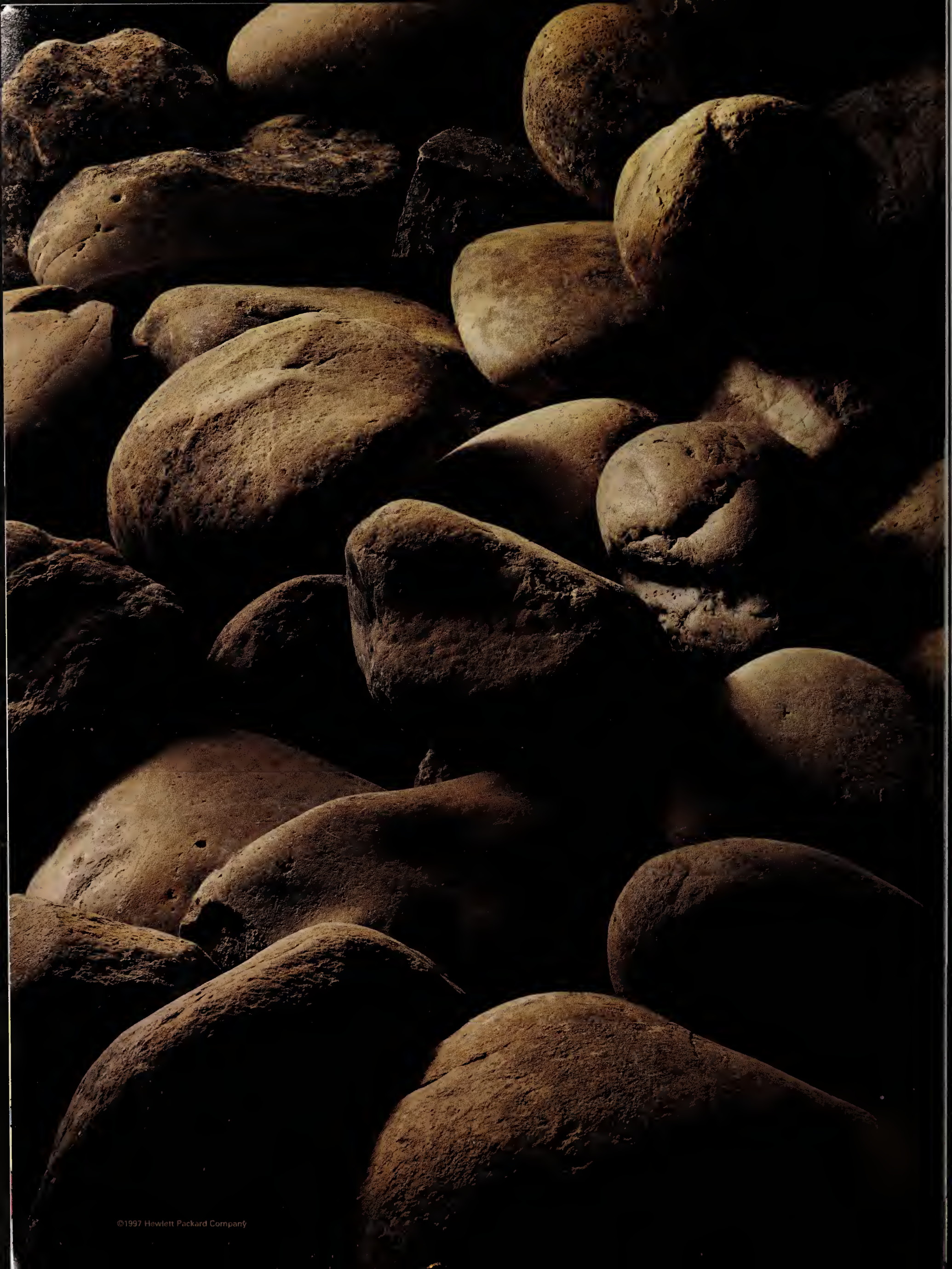
If there's one thing that identifies a true leader, it's industry acclaim. **Microsoft® Internet Information Server (IIS)** has been named "Best Web Server Software" by PC Computing, "Net Best" by ZD Internet Labs, and "Editors' Choice" by PC Magazine and Windows NT Magazine. In fact, IIS has earned more awards from industry experts than any other Web server in the solar system. Maybe it's because IIS is completely integrated with **Windows NT® Server**—so it's **easy to install**, **easy to manage**, and **secure**. Fact is, IIS is packed with breakthrough technologies—like **Active Server Pages**, which let you create dynamic content and powerful Web-based solutions using VBScript, JScript™ and ActiveX™ server components. **Microsoft NetShow™** which delivers dazzling live and on-demand multimedia. And **Microsoft Index Server** which makes it easy to search for Office and HTML documents. Plus, IIS is universally respected as the best foundation for next generation Web applications. All of which could make you Webmaster of the universe. For more information, or to order a free IIS 3.0 evaluation kit, go to www.microsoft.com/iis/promo/awards/ today.



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If the net is all about breaking down walls, how do you make sure a few still remain? The Internet promises accessibility. That is also its threat. But with HP's Praesidium enterprise security solutions like VirtualVault, exportable encryption and the latest smartcard technology, only the people you designate have access to your information. Our security solutions span any environment. And secure any enterprise. Come on in and see at www.hp.com/go/security Capitalize on chaos.

In Box

LETTER FROM THE EDITOR, READER FEEDBACK AND HOW TO REACH US

It's a rare individual who doesn't put off large, complicated projects in favor of smaller, more immediate distractions. (Why else has an entire industry grown up around project planning, time management and the rest?)

From an organizational standpoint, information and technology have fallen into a similar relationship, with technology taking the role of the distraction. I'm not suggesting technology is simple—or unimportant—but in the years leading up to the 21st century, it's tough to beat on the distraction scale.



Technology is hot. Information is deep. Technology is flashy, exciting and different. It lets us do things no one has done before. And because it's Big Business, there's a lot of talent directed at making it seem way more exciting than, when you get right down to it, it really is.

However, if Peter Drucker is right, we've reached a turning point in the information age (please see "How to Avoid Future Shock," Page 102). We're getting over our infatuation with the flashy and shifting our attention to the deep. Unfortunately, most of us still don't have much of a clue about how to leverage the information that drives our organizations.

That's one of the reasons Tom Davenport's *Information Ecology*, published this month by Oxford University Press, is an important book. Davenport, whose Think Tank column appears regularly in *CIO*, has devoted much of his distinguished career to the study of information and knowledge management. Along with Larry Prusak, Robert Eccles and Michael Hammer, he pioneered such concepts as information ecosystems, information architecture and models of information politics, which are beginning to come into vogue.

The book is both conceptually enlightening and practical—a difficult feat to accomplish. It is a must read for any chief information officer worthy of the title. We have included a substantial excerpt as well as a brief overview in this issue of *CIO*, beginning on Page 88.

Do you agree with Drucker that we've hit a turning point—that businesspeople, and in particular information executives, really are shifting the focus from the "T" to the "I" of IT? Send your thoughts to letters@cio.com.

Albie Lundberg
lundberg@cio.com

FROM OUR READERS

DISGRUNTLED IN SALES

We are considering outsourcing support for our field-force automation system. Using internal resources has proven costly—not so much in dollars but in the frustration the user experiences with dial-in issues, data fulfillment and support. Our internal IS group's recommendations have come from a laundry list of what "they," not the salespeople, felt comfortable with. Without taking into consideration the integration of various hardware and software components, the sales-force automation (SFA) system has evolved into a jalousie of sorts, always running poorly and being interfered with by other unrelated network components.

Fortunately, as an organization, we recognize the benefits of SFA and are equipping 450 more salespeople next week to bring the total to about 2,600 laptop-loving reps. However, our data center is not sensitive to the remote users' needs and can't relate to the odd hours people choose to dial in for information. So they don't respond when issues arise after-hours or on weekends, which is when a lot of our rollouts take place.

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In Box

In my position as a systems analyst within the sales department, I have inherited many systems problems. The communication servers are underpowered, and nobody can solve modem problems (not even the vendor that sold them to us) or give us a straight answer when our communication success rate goes up and down like a pogo stick.

The good news is that I'm getting the backing from internal management to re-architect the whole thing with up-to-date servers, modems, software and tools. I would like to outsource the monitoring of the system in an environment that is isolated from other LAN traffic and supported on a 24/7 basis.

Our internal IS group is actively upgrading the company to NetWare 4.X, but what they don't realize is that the upgrade won't solve the poor throughput and inconsistent menuing. The IS group has an infrastructure that simply can't support the number of clients on the LAN/WAN, and I don't want my stuff mixed in when they flick the switch on this one.

Coming to work for a highly reputable large company has left me looking back on the reliability and fault-tolerance that was second nature in my banking career. It has left me wondering how a successful company with deep pockets allows its IT function to run so poorly.

I'm interviewing vendors such as Dendrite, Sales Technologies, CorNet and others that all seem capable of handling my SFA requirements. The hard part is overcoming the objection I expect to get from the IS group who wants to control everything, even if they don't have a clue how to make it run properly.

Systems Analyst
Sales Department

A NEW KIND OF WORKFORCE
Your article on IS staffing ["A Good Staff is Hard to Find...and Keep," April 1, 1997] contained some good insights and tips. However, I can't help but notice that your panelists were all middle-aged white males (like me). I have to believe

that this group may not have quite a good handle on staffing and retention strategies for a workforce that is increasingly different from them.

The suggestions the panelists offered should apply to everyone, and I think there might be some additional tips of equal value that would have more relevance to today's (like it or not) younger, diverse, more demanding, cynical workforce.

Gil Gordon
Editor

Telecommuting Review
Gil Gordon Associates

Monmouth Junction, N.J.

74375.1667@compuserve.com

You're probably right. Perhaps other readers would like to send in ideas that work for them.



OUTSOURCING DEFINED

Maybe it was an April Fools' prank. The opening line in the April 1, 1997, article "Caveat Emptor: An Outsourcing Buyers Guide" reinforced exactly the type of fad du jour decision making that turns potentially valuable strategies into Dilbert punchlines. It's right there in bold: "So you've made the decision to outsource. Now what?"

Now what? Yikes. If you try to make that decision before doing your homework—if you decide first that you're going to outsource and then figure out what you're going to get and how much it's going to cost—your cart isn't just before the horse; it's rolling down the hill with your users and your IT strategy in it. The rest of the buyers guide was, as we've come to expect from CIO, excellent. Clearly, writer Tom Field knows



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Before trusting your mission-critical
data on a network...



take a critical look at the network.

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Actually, that line was meant to alert readers to the fact that we weren't going to discuss the decision-making process

offshore software development, Sept. 1, 1996, Page 44. www.cio.com/CIO/archive_sep_1_96_shipping.html

"The Provider Paradox"—Are "one-stop shopping" outsourcing providers shopping out your business? May 15, 1996, Page 34. www.cio.com/CIO/archive_may_15_96_ins.html

"Low Anxiety"—Companies that take tight control of the outsourcing process can succeed, Sept. 1, 1994, Page 56

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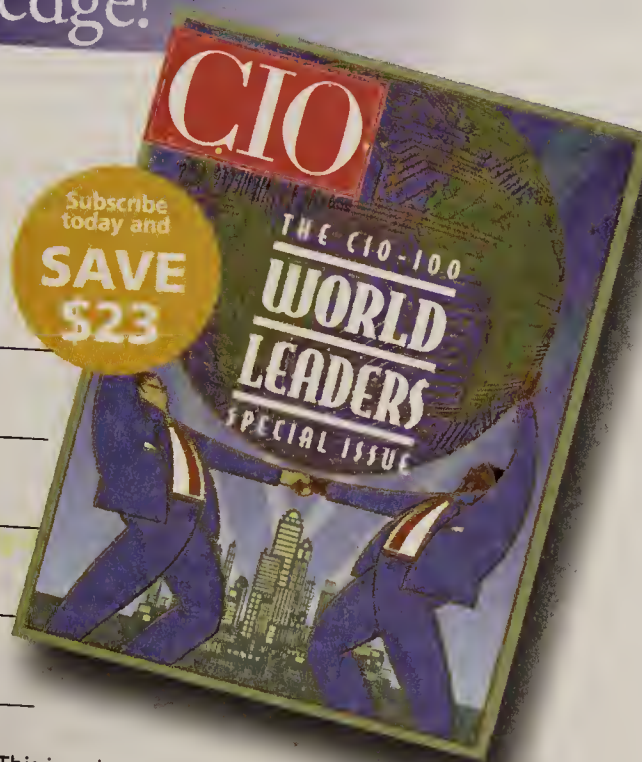
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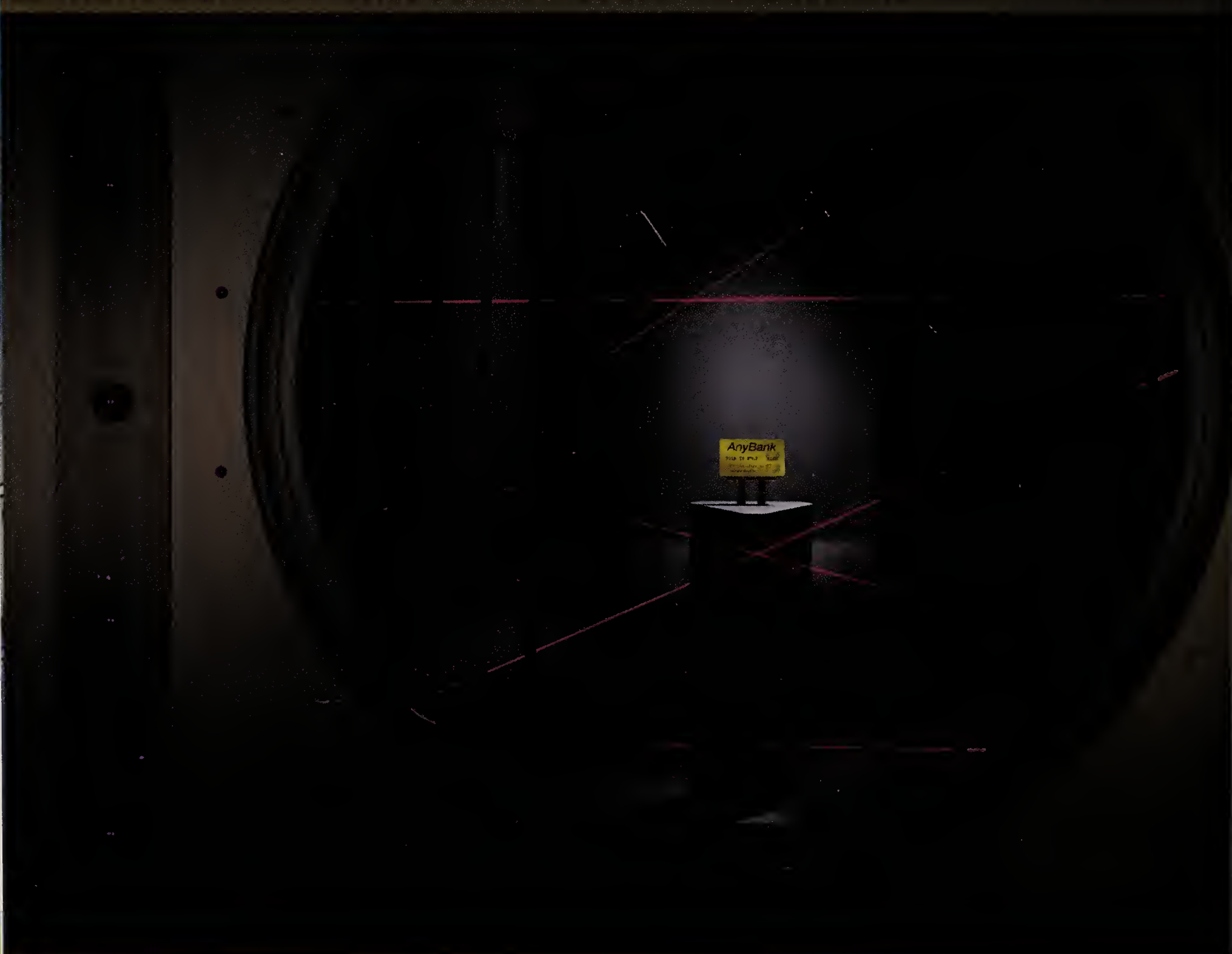
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Publisher's Note

"Shared services is a chance to get out in the forefront of business and begin thinking strategically about systems—common systems."

—James Aselta

Partner

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Shared Services is great, right? It can consolidate common functions, increase efficiency, escalate economies of scale, improve customer service....With all these apparently wonderful benefits, why are many employees failing to embrace this new practice?



The answer is obvious. Half of them are afraid it will cost too much and take too long. The other half are afraid all this consolidation translates into downsizing and that they will soon be out of a job. As the CIO and consequent pioneer of this effort, it is your responsibility to implement shared services while maintaining open communication with your employees and assuring them that they do, in fact, have job security. That is much easier said than done, however. Successfully performing this task is somewhat analogous to walking through a minefield unscathed.

So how do you do it? How do you convince the men and women to whom you report as well as the men and women who report to you that shared services is the way to go? Staff Writer Tom Field's article "Share & Share Alike," on Page 48, explores the pros and cons of implementing a shared services practice and the effect such an implementation can have on an organization. This article will teach you how to sell your compatriots on shared services diplomatically and, more important, how to implement it successfully.

Joseph L. Levy

P.S. CIO Communications has just released a new "best practices" report on Internet policy making. "Maximizing the Internet: Policies, Procedures & Best Practices" explores the formal (and informal) policy choices companies are making to derive benefit from the Internet's vast resources while maintaining acceptable levels of security, productivity and efficiency. This information-rich resource is available to CIO readers for \$395. For more information, contact Denise Perreault at 508 935-4443 or denisep@cio.com or visit our Web site at www.cio.com/CIO/survey.html.

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NEWS, INSIGHT, HUMOR, REVIEWS

Edited by Cheryl Dahle

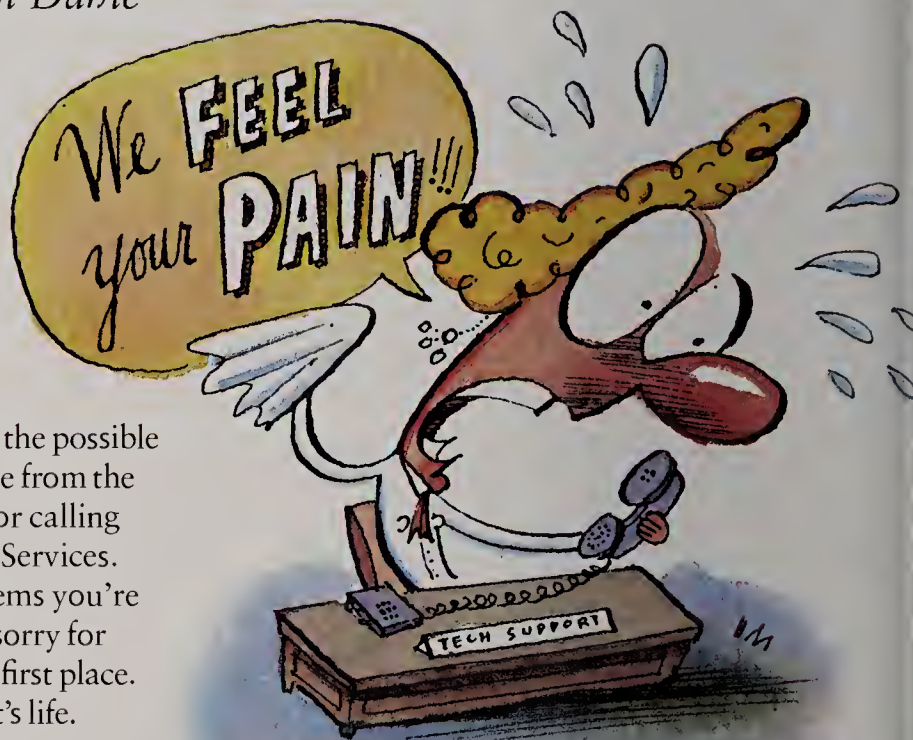
Sorry Service

BLUNDERWARE Sure, lots of software development companies have call centers you can ring when their applications have bugs, are impossible to set up or just plain don't work. But do they ever tell you they're sorry for wasting your time and energy? Nooo. They just toss you into their voice mail system like dirty laundry through a chute.

But Alan Bose, manager of information services for Continental Web Press, received a letter from Siemens Rolm Communications Inc. that might herald a new era of sensitivity in call center

customer service. The letter promoted the company's "Application Consolation Services." Yeah, yeah. Consult, console—same diff.

Bose waxed creative on the possible phone call that might ensue from the typo: "Hello, thank you for calling Application Consolation Services. We're sorry for the problems you're having. We know you're sorry for buying the software in the first place. We feel your pain. But that's life. Please hold." ■



It's the Third Quarter. Do You Know How Your Company is Doing?

CLUELESS It seems a little like driving a car without glancing at the speedometer, the gas gauge or the rearview mirror: CEOs of America's fastest-growing companies admit they don't spend enough time monitoring "vital signs" of their companies—sales, cash flow and accounts receivable—according to a report by Coopers & Lybrand LLP. What's more, of the two-thirds who say they do keep close tabs on their critical business data, only 68 percent use a computer to do so; the rest rely on written or oral reports.

The study, which was

conducted with assistance from opinion and economic research company Business Science International, surveyed 428 CEOs of the fastest-growing U.S. product and service companies. Despite working an average of 57

hours per week, CEOs of these companies, which range in size from \$1 million to \$50 million in revenues/sales, say the complexity of modern business simply prevents them from keeping an adequate focus on those business health indicators.

How can an enterprising CIO help bridge the CEO's information gap? The flip answer is "provide data," but the real answer, according to Hartford, Conn.-based Brian Brumit, Coopers & Lybrand's national director of business systems advisory service, is to provide the right data. Not just the typical financial and accounting data that people think CEOs want to see but the key operating information the CEOs say they want: new orders, project status and cus-

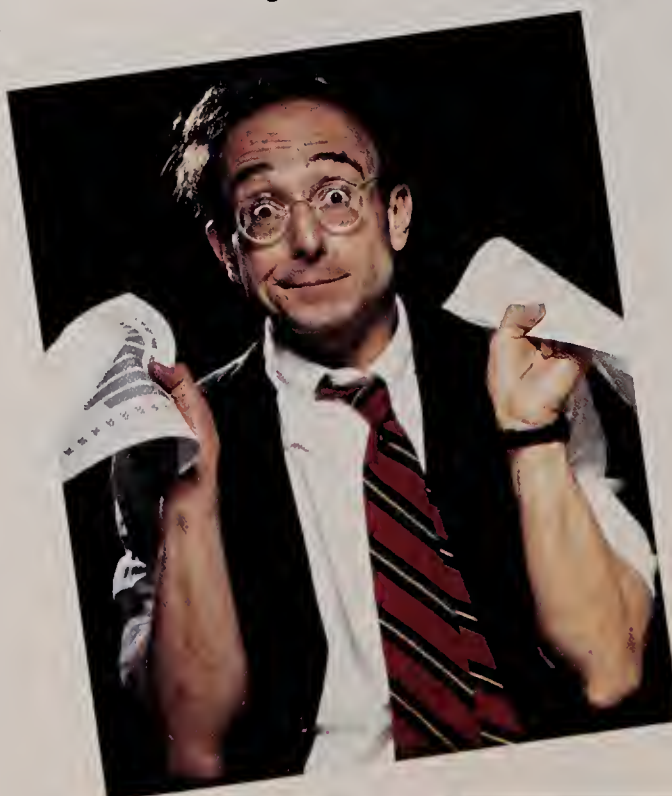


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tomor satisfaction.

"Typically, information systems do a great job displaying numeric data but a crummy job with the story behind those numbers," Brumit says. "The CIO's job is to pull up the right information and [put it in context] so the CEO has the ability to make some meaningful analysis."

Brumit says CIOs have to equip their bosses to move beyond the "monthly report mind-set" and see how some of this data can be reviewed in real-time to influence daily decisions. "The idea that something magic happens only at the end of the month is ludicrous," Brumit says. "Something magic happens every day." ■

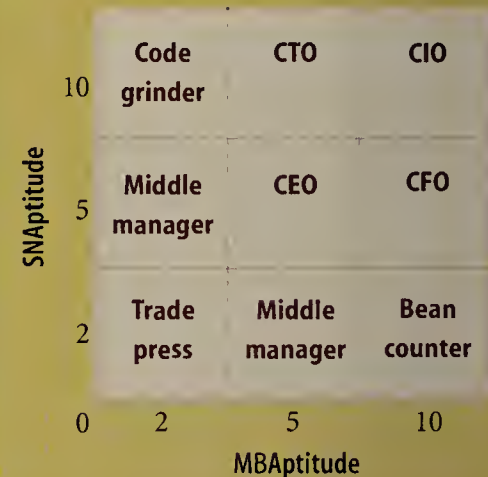
Tech Geek or Business Freak?

Seems the CIO job is forever flipping back and forth between needing to be a business strategist and a super technologist. Do you have the skill sets necessary to sit on both sides of the teeter-totter?

Figure out what the acronyms below stand for. (You have 10 minutes; please, no whining about needing context.) Check your answers against the key printed below. Award yourself 1 point in the appropriate category for each correct answer. This will determine your technical score (SNAptitude, named for the mainframe protocol) and your business score (MBAptitude, named for the business degree).

On this handy graph, plot your SNAptitude (on the vertical axis) against your MBAptitude (on the other axis). The result will help you determine the right corporate position for your mix of knowledge.

TECHNO TERMS	BUSINESS TERMS
1 ES/9000	1 ISO 9000
2 HLLAPI	2 LBO
3 OODB	3 BPR
4 LU	4 ABC
5 RMON MIB	5 TQM
6 DSU/CSU	6 ROI
7 JAD	7 EVA
8 ASCII	8 JIT
9 ERP	9 P/E
10 FDDI	10 DSFA



TECHNO TERMS 1 Enterprise System 9000, 2 High-Level Language Application Program Interface, 3 Object-Oriented Database, 4 Logical Unit, 5 Remote Monitoring Information Base, 6 Data Service Unit/Channel Service Unit, 7 Joint Application Development, 8 American Standard Code for Information Interchange, 9 Enterprise Resource Planning, 10 Fiber Distributed Data Interface **BUSINESS TERMS** 1 International Organization for Standardization 9000, 2 Leveraged Buyout, 3 Business Process Reengineering, 4 Activity-Based Costing, 5 Total Quality Management, 6 Return on Investment, 7 Economic Value Added, 8 Just in Time, 9 Price/Earnings Ratio, 10 Doesn't Stand For Anything (If you guessed something else here, your CEO probably knows you're faking it.)

CREATED BY DEREK SLATER

Real Java Programming

NEW TECHNOLOGY

Imagine being able to have more processing power in the cup of coffee you sip with your morning doughnut than in your state-of-the-art Pentium computer. Well, research teams at several universities and laboratories are exploring a new way to build computational ability into physical matter—even in the caffeine molecules in java. The resulting brew could support the world's most powerful search engine—a computer in a coffee cup that could find an information needle in a data haystack almost instantly.

Based on quantum physics and the idea that any physical material can contain information, quantum computing controls the spin of millions of atoms to enable true parallel processing, or one processor performing multiple activities simultaneously. Quantum bits, or qubits, differ



significantly from traditional bits, the binary digits used to encode computational data. Because they're not limited to a binary state, qubits can represent points on a continuum of values between "on" and "off." By creating a quantum computer, computer scientists hope to far surpass the processing capability of classic computers, which no matter how fast can do only one thing at a time.

Last year, Lov Grover, a computer scientist at Murray Hill, N.J.-based Bell Labs, designed a search algorithm that quantum computers could use to search an unstructured database for a number of possibilities simultaneously, canceling out contradictory data and increasing the odds of finding the needed item.

A 10-qubit quantum computer such as one in development by the Physics and Media Group at MIT could perform 1,024 calculations at the same time.

It's a great idea, but the theoretical development of quantum algorithms is further along than experimentation with the computers themselves. Because quantum systems can maintain so many states

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PeopleSoft's workflow-enabled applications route the right information to the right people at the right time in the right form. That can not only improve the productivity of your organization, but can also facilitate business process redesign, reduce paperwork, and automate administrative tasks. How's that for working hard?

PeopleSoft's workflow is open, so it can integrate with a variety of third-party products. You can use email for notifications, and electronic forms for turning around approvals. Or use internet forms and interactive voice response systems to communicate with PeopleSoft applications.

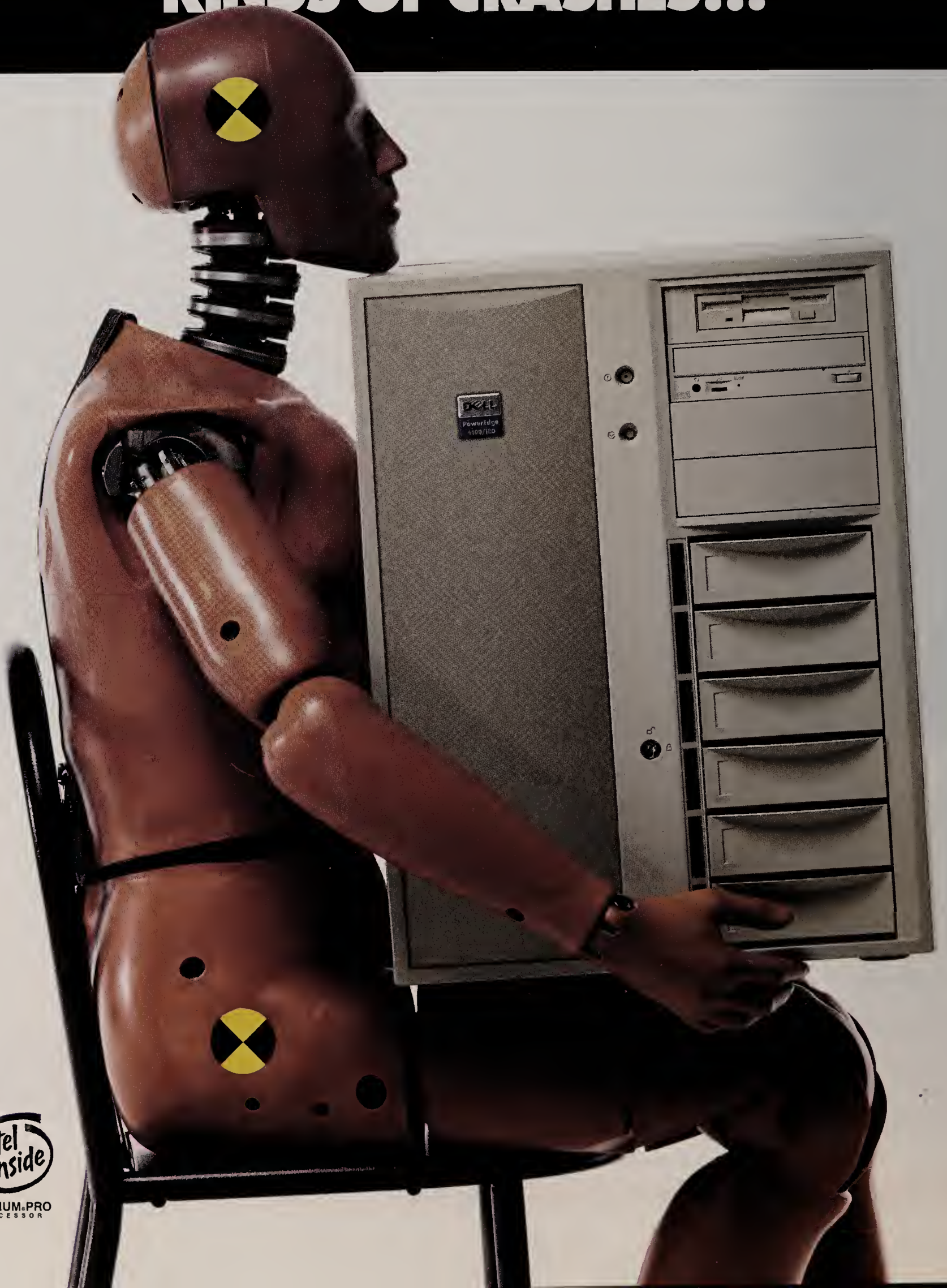
And, unlike some solutions, PeopleSoft's are flexible enough for you to define your own processes and procedures. In other words, PeopleSoft adapts to the way you work, not the other way around.

No wonder 1350 organizations worldwide have chosen PeopleSoft. For more information on how PeopleSoft's workflow solutions can help your organization, call 800-947-7753 and ask for our workflow white paper. Or visit us at workflow.peoplesoft.com. You'll discover we have the technology, the people, and the commitment it takes to help you increase your productivity. Without increasing your workload.



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network. Even a feature called Remote Assistant that operates independently of the system, dialing out to notify you in the event of certain failures and letting you dial back in to address the problem. Something you'd normally have to pay extra for. So protect your network with a Dell server. And protect yourself from the price gouging of the server status quo.

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- Intel Pro 100B PCI Ethernet Adapter
- Redundant Hot-Swappable Power Supplies
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-Dell Remote Assistant
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Product Code: 200213

HIGH-END SERVERS

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Trendlines

simultaneously, they're extremely delicate. Extracting information from a system can contaminate or destroy its data.

At MIT, Associate Professor Neil Gershenfeld and Isaac Chuang of Los Alamos National Laboratory have experimented with nuclear magnetic resonance spectroscopy, which involves sending radio waves through a cluster of molecules in a magnetic field. The waves cause the molecules to spin and emit signals. Unfortunately, the waves can also alter the molecules' spin so that it destroys the system's data. Gershenfeld and Chuang learned that by using backup copies of the molecules, basically a large thermal system of a hundred billion trillion carbon atoms, they could perform several computations before the system collapsed. By using more complex molecules, such as caffeine, the two hope to create a 10-qubit device by the end of the year.

Now that's strong coffee.

—Heath Row

Getting Paid

PAYROLL SYSTEMS Payroll is one of those unglamorous business functions that get noticed only when things go wrong. Reason enough, perhaps, why a lot of payroll departments balk at the prospect of moving such critical yet low-profile systems to client/server architectures.

When it comes to payroll system performance, InPower Inc. is laying down a challenge to its cus-

Findings The Inevitable Intranet

The Web is the Way

Standing in the way of a corporate intranet initiative is akin to stepping in front of a speeding car with no brakes (though perhaps not as scary as handling crowd control at a European soccer match). Delphi Consulting Group Inc.'s recent intranet report surveyed 600-plus "technically sophisticated business people," and a whopping 97 percent of the respondents said all new business application development should be aimed at Web use. "When the intranet phenomenon first began to take hold, there was tremendous resistance in the IS ranks because of security and integrity issues," says Thomas M.

Koulopoulos, founder and president of Delphi in Boston. "But users are saying, 'To heck with your concerns; we've finally found what looks like a cross-platform solution.'"

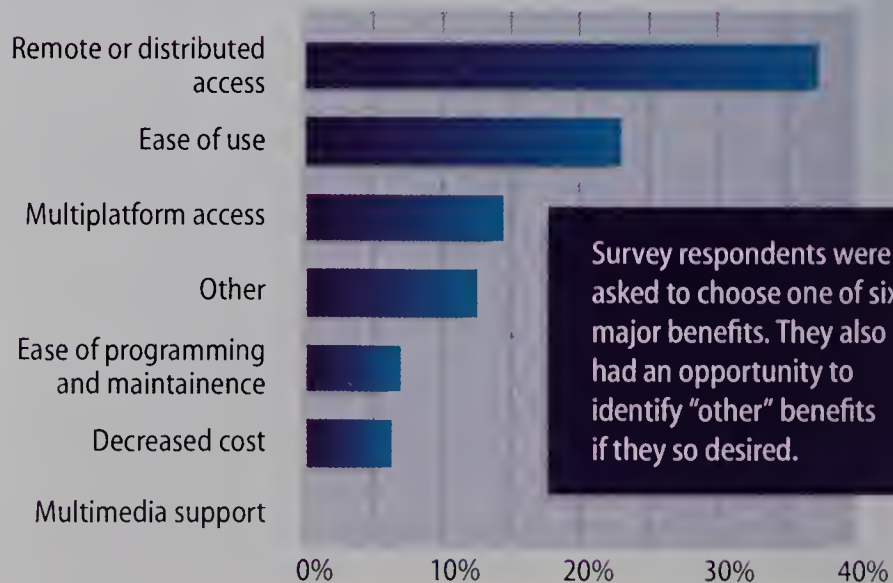
Alas, implementation lags behind desire, as always. Usage centers primarily on disseminating internal information; roughly a third of the response base said corporate information distribution is the primary intranet function. Only about 16 percent said they use the intranet for line-of-business applications.

Thirty-seven percent said they have at least three-quarters of their desktops connected to their intranet. (Delphi says that 75 percent penetration essentially amounts to full deployment.) Looking ahead three years, 82 percent of respondents expect that level of connectivity.

One surprise in the survey was that security was ranked not as the foremost concern but as the fourth. Bandwidth led the list of "intranet frustrations," mentioned by 21 percent of respondents, and integration with existing systems followed closely at 20 percent. Security, at 14 percent, also ranked behind "difficulties of file management" at 15 percent.

—Derek Slater

Ranking the Benefits of Intranet Applications



SOURCE: DELPHI CONSULTING GROUP INC.



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tomers by inviting them to replicate results of a recent benchmark report. The San Francisco-based developer of human resource and payroll applications tested its InPower Pay client/server payroll software earlier this year. The company ran a series of tests at Hewlett-Packard Co.'s Capacity Planning Center in Cupertino, Calif., that were designed to reflect real-world scenarios at large companies. The tests ran a representative sample of 5,000 hourly and salaried employees who were paid from more than 20 different compensation plans.

During the test, InPower Pay processed complete payroll functions for 3,941 employees per hour on a single-processor machine and more than 58,000 payroll calculations per hour on an eight-processor machine.

According to Barbara Noti, a senior research analyst in the application delivery strategies service at the Méta Group Inc. in Stamford, Conn., the results are significant. "InPower ran the complete job stream that customers run in the real world and used realistic data and transaction mixes on typical configurations that real-world customers can afford in production environments," she says. For more information, call Maria Miller at 800 930-0165 or visit InPower's Web page at www.inpower.com. ■

THE CIO DECADE READER SNAPSHOT

Mark Ripplinger

Vice President and CIO,
Crown Life Insurance Co.,
Regina, Saskatchewan, Canada

Career Moves, 1987-97: Three companies, three positions

Years Reading CIO: Eight

10 Years Ago: Vice president of systems at Co-operators Financial Services Ltd. in Guelph, Ontario. Developing PC-based tools for field sales and service agents and replacing a national automobile policy management and processing system.

Biggest Moment: "As the first CIO in Crown Life's history, I got the entire organization engaged in our strategic plan—130 people participated in defining it, including senior executives and business people from corporate and every product line."

Lessons Learned: "I've learned not to use the labels 'user' or 'internal customers' because they imply something reliant, a vendor-customer relationship where one drives and the other serves. IS as utility is not the model today, at least in the financial services industry. Now I preach the notion of a business partnership, where everyone has a role on the same team."

IT's Biggest Impact: "In the corporate office, the biggest change IT contributed to over the past decade was lowering our costs. In a mature industry like insurance, the only sustainable competitive advantage is low cost. Companywide, the biggest change has been how IT enabled the field, tying remote offices and sales forces together. That's really been a catalyst for changing behavior."

Alternative Career Choice: "Maybe I'd own a marina in the Bahamas. I'd apply the same principles of quality and customer service but for a clientele that was there to have fun."

—Richard Pastore



Where
Were You
10 Years
Ago?

IN SEPTEMBER, we'll celebrate the 10th anniversary of CIO. In the months leading up to our 10th Anniversary issue, we'll be asking readers to look back and tell us where they were in 1987 and how they ended up where they are today. We invite you to tell us your story when you visit our Web site at www.cio.com/snapshots/.

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☐ Send me more information on WebFOCUS ☐ Please have marketing rep call

☐ We will be evaluating new web technology over the next

☐ 1-3 months ☐ 3-9 months ☐ 9-12 months ☐ No plans to evaluate

Has budget been allocated? ☐ Yes ☐ No

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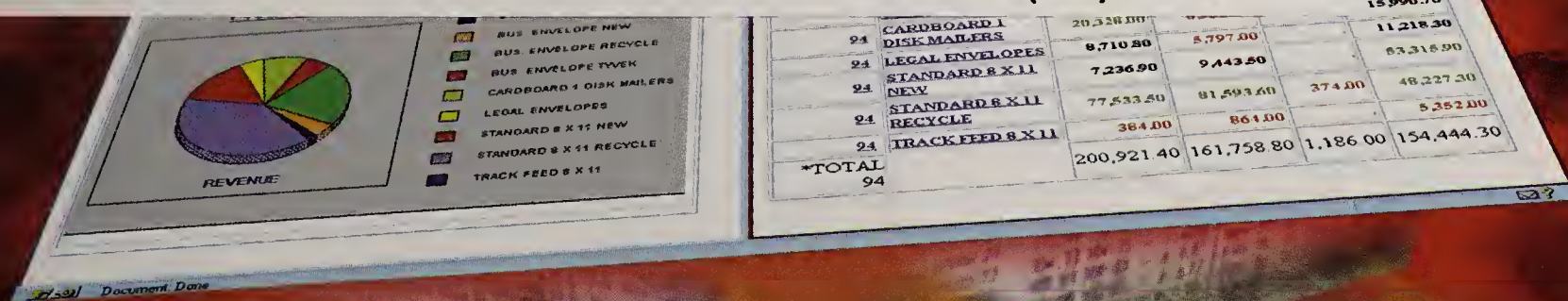
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Executive Counsel *By Cheryl Dahle*

MANAGING YOUR CAREER, STAFF AND PROFESSIONAL RELATIONSHIPS

The Honeymooners

The experiences of two CIOs suggest strategies the newly hired can pursue to keep the bloom on the rose

YOU'VE PROBABLY HEARD the saga of the three-year CIO: He spends the first year in a new job doing the handshake hoedown with senior executives and perfecting the IS budget. But in year two—his reality meter warped by grateful, misty-eyed users flinging roses—the CIO overcommits. The result is a none-too-gentle escort to the exit in year three. Then it's lather, rinse, repeat at the next company.

While that scenario is perhaps exaggerated, it suggests the dilemma all CIOs face when they start a new job: How do you make the honeymoon last?

Scott Dinsdale, CIO at New York-based BMG Entertainment, has a

few theories on how CIOs can preserve the magic. Dinsdale, who came to BMG from a financial services background, is heading into his third year and, from all internal accounts, is still wearing his white hat. When he took responsibility for worldwide IT operations at the \$5.8 billion entertainment company (which has outposts in about 43 countries), he had two goals for his honeymoon—cultivate relationships with key business players and establish credibility. That meant dividing his time between learning about the music business (not to mention BMG's people and culture) and snagging some low-hanging fruit to impress the users. "At one end of that spectrum are the large-scale projects, the long-term plan for how IT will contribute to the business," Dinsdale explains. "At the other end is getting the network back up when it fails. I spent the first 60 days at the extreme ends of the spectrum, and very little time in between."

Sprint Fast

Pulling off IS quickies is a key strategy for CIOs newly wed to their corporations, says Beverly Lieberman, president of Halbrecht Lieberman Associates Inc., a CIO executive search firm. "While they're developing a long-range plan, they are also seeking quick hits in the first three months," she says. "The CIO tries to find those

nagging little problems and fix them. They want to earn some credibility by doing something."

For Dinsdale, the noisiest day-to-day problems were desktop-related. The network constantly crashed. He had more than five e-mail systems going, none of which worked reliably, and the PC software collection was a hodgepodge of mostly outmoded DOS applications. As a result, the users were notably skeptical about IS's capabilities.

"Downtime was measured in hours per week," Dinsdale says. "I had come from a background where you measure downtime in hours per decade." One piece of the solution was to bring in a network expert to stabilize the company's networking infrastructure. Then Dinsdale focused on improving the services of the PC help desk and persuaded the business units to standardize on software by securing volume discounts on the software he wanted to support.

Downtime dropped and, presto, IS had a reputation for responsiveness. But more than that, the improvement in desktop services was the perfect ointment for the business executives' festering IT cynicism and made possible a dialogue about long-term issues.

"You wanted to talk to them about long-term business goals and vision, but the nonfunctioning desktops [caused] static that got in the way of establishing healthy relationships," says Anne Payne, president of Prism Consulting Inc., which specializes in IT strategy. (Dinsdale made retaining Payne a condition of his accepting the job.) "They were saying, 'Why should I talk to you about strategy when I can't even send e-mail?'"

According to Karen Antion, who joined The Port Authority of New York and New Jersey as CIO three years ago, the real value of overcoming those sorts of lingering technonuisances lies in proving to the business community that you get more than IT—you get *it*. "Your responses demonstrate that you are listening



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Executive Counsel

and that what is important to them is important to you, and you're interested in doing what's within your power to fix it," says Antion.

Her public company rules a domain extending 25 miles from the Statue of Liberty in all directions, including parts of New Jersey. That jurisdiction encompasses Kennedy, Newark and LaGuardia airports, boat traffic and ports on the Hudson, the World Trade Center, and the tunnel, bridge and rail pathways between the two states.

When Antion was first hired, the head of aviation, whom Antion describes as a power user with laptop constantly in tow, was looking to link all three airports on a WAN. The Port Authority had hired a consultant who estimated that the project would take two years and consume nearly \$5 million, a cost and timetable that the aviation head found unacceptable. Antion says that during the honeymoon she was able to offer the aviation director an alternative: Why not partner with vendors for a beta project to build an asynchronous transfer mode network instead? "He ended up with a faster medium and more bandwidth, and we put that up in nine months for less than a million dollars," Antion says. "It was sort of an instant gratification item for him. And it was really a good news story

for us that helped us build a lot of credibility in the organization."

Go Long

But dealing with the short-term issues while neglecting a long-term strategy is dumb. Jan Hopland, vice president at Symmetrix Inc., a consulting group based in Lexington, Mass., tells the story of a global manufacturing company CIO who blew off the long-term stuff. His predecessor had been fired mostly because he was unpopular with the senior managers. (Business execs can be so cruel.) The new CIO, however, decided to focus on relationships at the expense of strategy and took the company off-course. Bye-bye, new guy. "He lasted about a year," Hopland says.

From the git-go, Dinsdale knew he'd have to do a bang-up job crafting a global IT strategy for BMG (which had never had any IT strategy) if he wanted to continue to hang his white hat on the hook in his office. Delegation was crucial, which was why he insisted on hiring Payne, president and founder of Prism, a University Park, Fla.-based consultancy, who was formerly a CIO for EMI and has more than 20 years' experience in the music industry.

During the first two and a half months of Dinsdale's tenure, Payne conducted



more than 60 interviews with business people in the company. Most of the interview questions had nothing to do with IT. Instead, Payne asked about the music business and where it was headed, how BMG fit into that picture and where its competitors stood. The executives were floored by the idea that IS was doing what amounted to door-to-door canvassing to learn about the business direction of its constituents. "It usually shocked people," Payne says. "There were people who refused to see me at first because they said, 'I don't have a com-

This is a mouse...

One CIO wired the top brass and changed her company culture

IT'S NOT EASY to call your boss a hypocrite. But that's essentially what Karen Antion did (ever so gently) when she hired on as CIO at The Port Authority of New York and New Jersey three years ago.

She had a chat with the then-CEO that went something like this. He said: "I know it's true that technology is the means to my business end. But I also think that I'm not getting the bang I want out of my IT investment buck." She said: "How do you *know* that?"

None of the senior executives at The Port Authority, including the CEO, had PCs—a big problem for a CIO trying to demonstrate the benefits of IT.

"If you don't use technology on your job, it's hard to understand the real value of it," Antion said. "I can present statistics. I can present productivity improvement. But unless you sit down in front of a PC and that proves productive for you, the value is not self-evident."

So Antion kicked off a program, called "Technology at the Top," which aimed to put a PC on the desk of every business bigshot. She contracted

with an outside tutoring firm to give one-on-one lessons to avoid the top brass having to display their computer ignorance to an audience of their colleagues. "Children know how to use a PC," Antion says. "Today it's difficult for the president of a company to get over that initial learning curve without being embarrassed about what he doesn't know."

One of the most popular programs among the execs was a calendaring application that let them print their schedules on index cards and carry them in their planners. Next came an executive LAN; now top managers regularly surf the company home page and offer suggestions to IS.

"I knew that we had reached success when the CEO went on a trip to Asia and he called me to have a laptop issued to him," Antion says. "Then while he was there, he even faxed things back using his laptop fax/modem. [Technology has] changed the culture at the top of the organization."

—C. Dahle

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puter. I don't need to talk to you. I have nothing to say about IT strategy.' But once they found out that I wanted to talk about their business and not information technology, they were eager."

The kicker question in the interviews went something like this: If you had a magic wand and could get any information you wanted and create any IT system to deliver it, what would that be? "That ended up being the most fruitful part of the interview," Payne says. "The implication of having a magic wand is that you can give them things that are impossible to do. But we found that because the information technology IQ of the company as a whole was very low, they were usually asking for things that were possible to do today."

The interviews did more than earn the fickle affection of IS's customers; they also ensured that the final version of the long-term strategy was a no-brainer for managers to support—after all, they had helped craft it. "Whenever we had a

change [to propose]," says Payne, "Scott gave a presentation at a management meeting about what we were learning and where we thought we were headed." The duo followed up the initial interviews with a second round of 200 more six months into the honeymoon. "It was not a big-bang approach to change but an incremental one," says Payne. "There were no surprises, because the dialogue was continuous."

While those interviews were going on, Payne and Dinsdale pulled together a "hit list" of the managers in the company whose support was indispensable to the long-term plan. The crux of the strategy meant reshuffling the company's IT priorities for where it spent energy and money. Historically, most of BMG's IT resources had been funneled into back-office functions like accounting and operations—systems that were essential to run the business but did nothing to help it grow. Dinsdale gleaned from talking to the execs on his hit list that IS

needed to refocus on making the functions that supported the revenue stream world class. "The operational system should be smooth and seamless, but it doesn't have to be God's gift to accounting," he says. "It just has to work."

Dinsdale used the support of people like Pete Jones, the president of BMG Distribution (one of the more than 200 legal entities that BMG comprises), to launch projects aimed at sales and marketing. Jones snagged three managers reporting to him to give feedback to IS. The result was a data warehouse that combines airplay data (on how often BMG music gets played on radio and TV) and in-store scan data to give sales reps real-time feedback on their sales efforts on a project-by-project basis. Dinsdale traces the success of that application back to water-cooler chats he had with Jones in his first few weeks. "You pick out the top two or three executives you are dealing with, and you begin there," Dinsdale says. "Through casual discussions with people,

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Trust Me, Really

Keep your ears open to earn staff's trust

EARNING THE TRUST OF YOUR NEW STAFF IS DIFFICULT if you still have blood on your hands from a recent hatchet act. Unfortunately, firing is a fact of life during the honeymoon. "You're walking a fine line," says Scott Dinsdale, CIO at BMG Entertainment. "You want to earn their trust. But they're worried about their jobs. And to some degree, if things are dysfunctional, they should be."

Other CIOs and consultants advise newbies to heed the squeaky wheels in their IT shops. Find out if there are reasons for complaints before you dismiss them. Remember that other staff will be watching your reaction.

"No matter how ludicrous the complaint, it has to be, 'Oh, thanks for coming,'" says Dwight Gertz, CEO of Symmetrix Inc. "You need to be sure everyone knows that you talked to this guy and he came back with his head still on his shoulders."

As for sorting through the rumors and personality conflicts that can obscure the issue of a staff member's real talents (or lack thereof), Dinsdale advocates a direct approach: "You sit down and you say, 'From what I hear, you aren't productive and you don't care what users think. That can't be right. Let me hear your side of the story.'" —C. Dahle

you start getting a sense of who the influencers are. It was clear to me that Peter was one of those people."

Antion had to pull off a similar coup at The Port Authority, where the focus of the IT department had traditionally

overlooked revenue-generating activities as a part of its calling. The relationship she had developed with the aviation head during the ATM project gained her his support for other new ventures, including a partnership with news-con-

tent providers in which the airports will deliver a captive, demographically desirable audience to advertisers in exchange for a nice sum. "I think, more than anything, the successes that I personally have realized were the result of some of the things I established during the honeymoon period," Antion says. "That's when I raised the issue of revenue generation. IS had thought of itself as the people responsible for building, developing and buying systems, and I said that our job here was to leverage technology to enable the business."

Yeah, but talk about your short tenures. Antion's term as CIO didn't last even three years. Eighteen months ago, she was promoted to CTO, with added responsibilities including oversight of the port's engineering department and capital program. But that's the kind of turnover you could learn to love. **CIO**

Associate Editor Cheryl Dahle can be reached at cdahle@cio.com.

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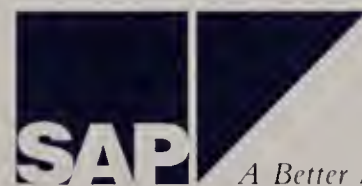
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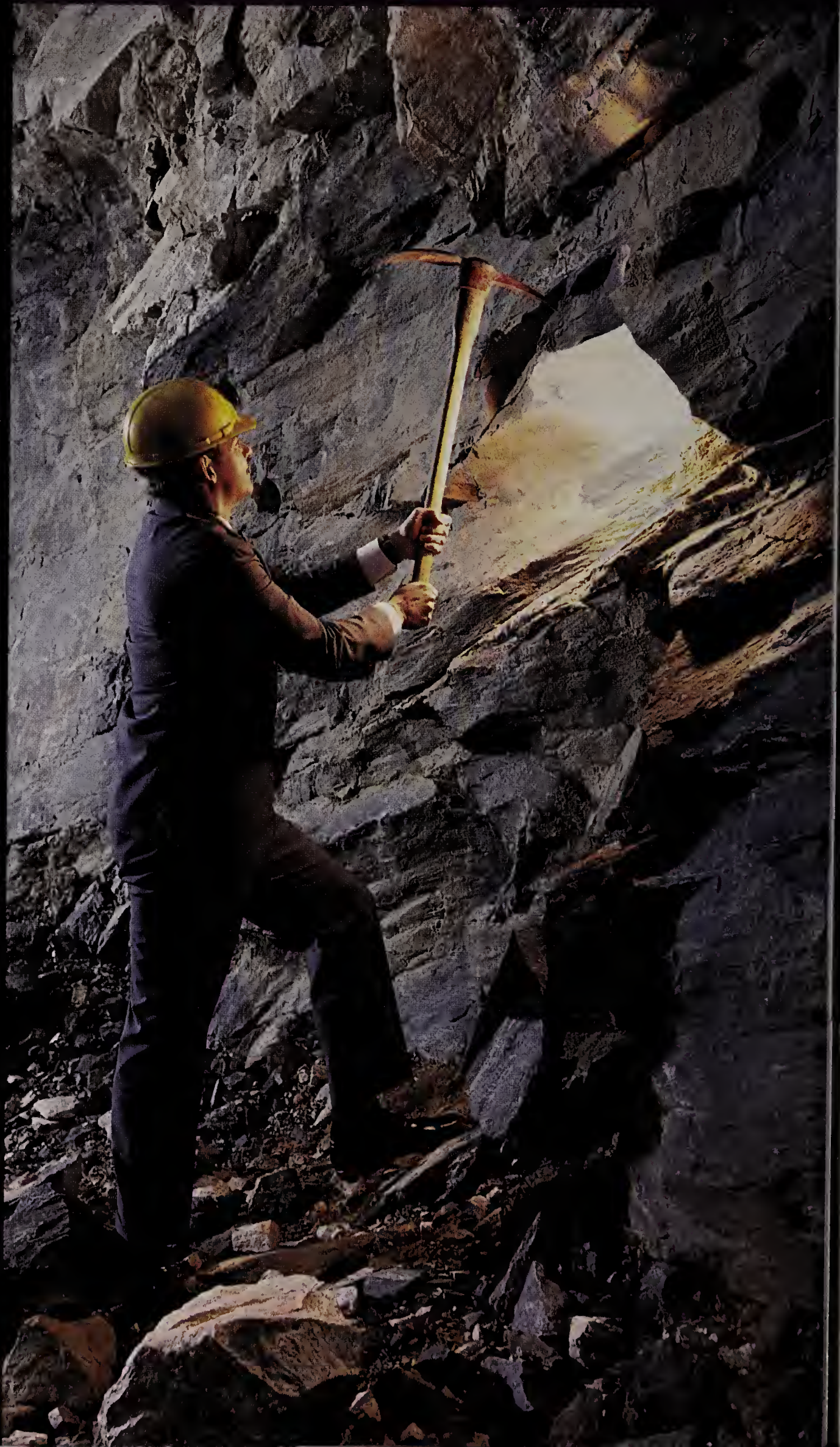
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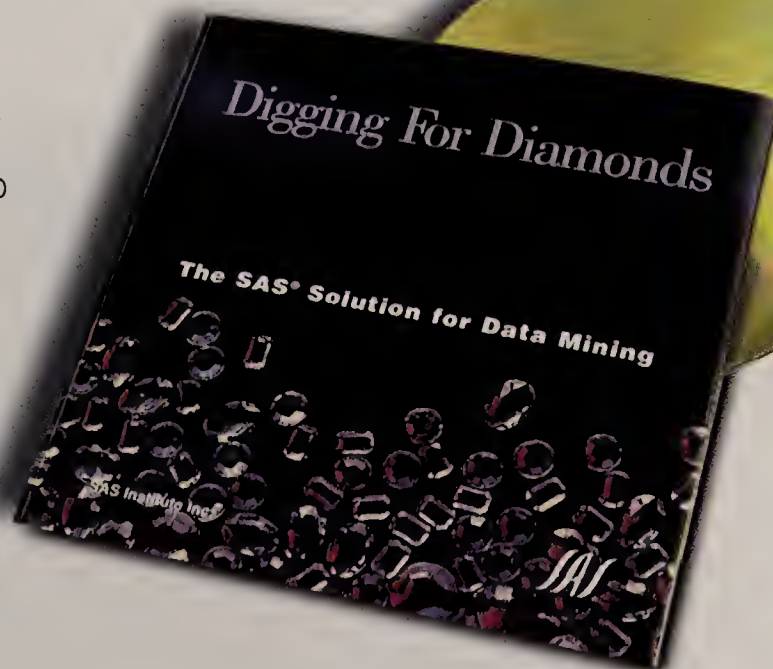
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LESSONS LEARNED FROM PEOPLE IN THE KNOW

Alignment Revisited

If you build the right model and commit to the change, you can finally link the strategy of business and IT

BY LARAIN RODGERS

SEEMS LIKE EVERY CIO ASKED about the biggest challenge over the last decade has said, "aligning business and information technology." The catch phrase always makes the Top 10 of the annual CSC list of CIO concerns and was ranked number one or two in each of the last five years. So why aren't we doing much about it?

As a consultant to executives in a broad range of industries, including telecommunications, financial services and government, I've watched the rate of technology-driven change in business grow even as business leaders' denial of such change, reflected by in-

action, increases. We look at components like projects and planning in isolation; we think up IT strategies and propose IT initiatives. But there's really no such thing as an "IT-only initiative." Face it, folks: The days of centralized IT control, reinforced with strong hierarchies, are fading fast as technology is transformed from an engineering discipline to a universal demand. Companies try in vain to contain IT spending while end users, frustrated by the lack of central technology support, invest their own time and budget dollars in hardware, software and networks. The result: Thin server-fat client now rules, with myriad data stores, products and suboptimized components proliferating in our

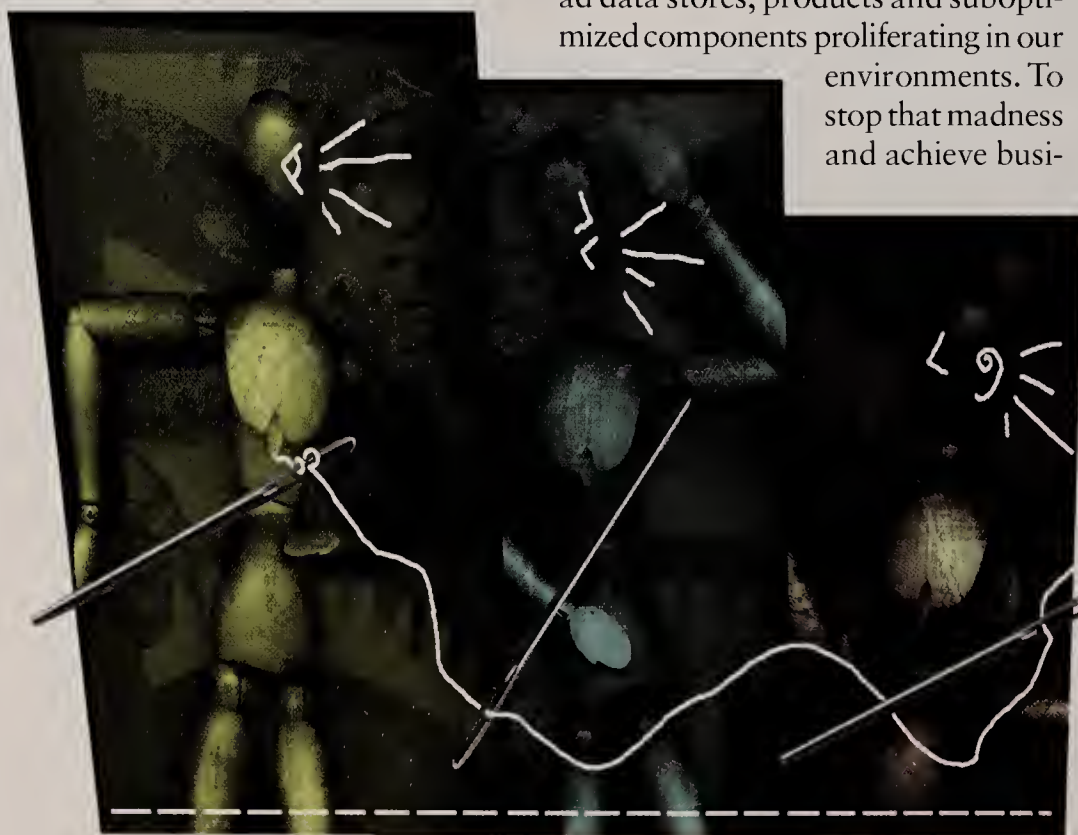
environments. To stop that madness and achieve busi-

ness-IT alignment, we must realize that we're dealing with the overall enterprise. We need to address it holistically using a business model that weaves together people, processes and technology across the organization.

Model Building

Sure it's hard, especially the people part. But it's doable. As an academic exercise, building the model is relatively straightforward: The top layer consists of people and their management practices, and it's where the skills and commitment reside; operations that are specific to individual companies and determine how they actually run—such as customer service, marketing or manufacturing processes—constitute the middle layer; and the bottom layer is made up of the enablers, including IT.

In the past, just building the model and diagramming the complex relationships it delineates was a nightmare. In 1978, I was one of two dozen American Express Co. teammates assigned to redesign the company's accounts receivable system, which is the core of the credit card processing business. We spent a week learning structured analysis to help us depict data flow—where information came from, where it went and how it was used—and operations across the enterprise. Then we tried to develop a comprehensive future state model of the accounts receivable function and come up with a plan for how American Express could get there. We diagrammed the data flow for our current and future enterprises. Then we valiantly codified the nine business processes of American Express card operations and showed their interrelationships on a large conference table using the best technology we had—multicolored note cards. Today, tools such as business process reengineering and value stream assessment have evolved to help illustrate information flow, create

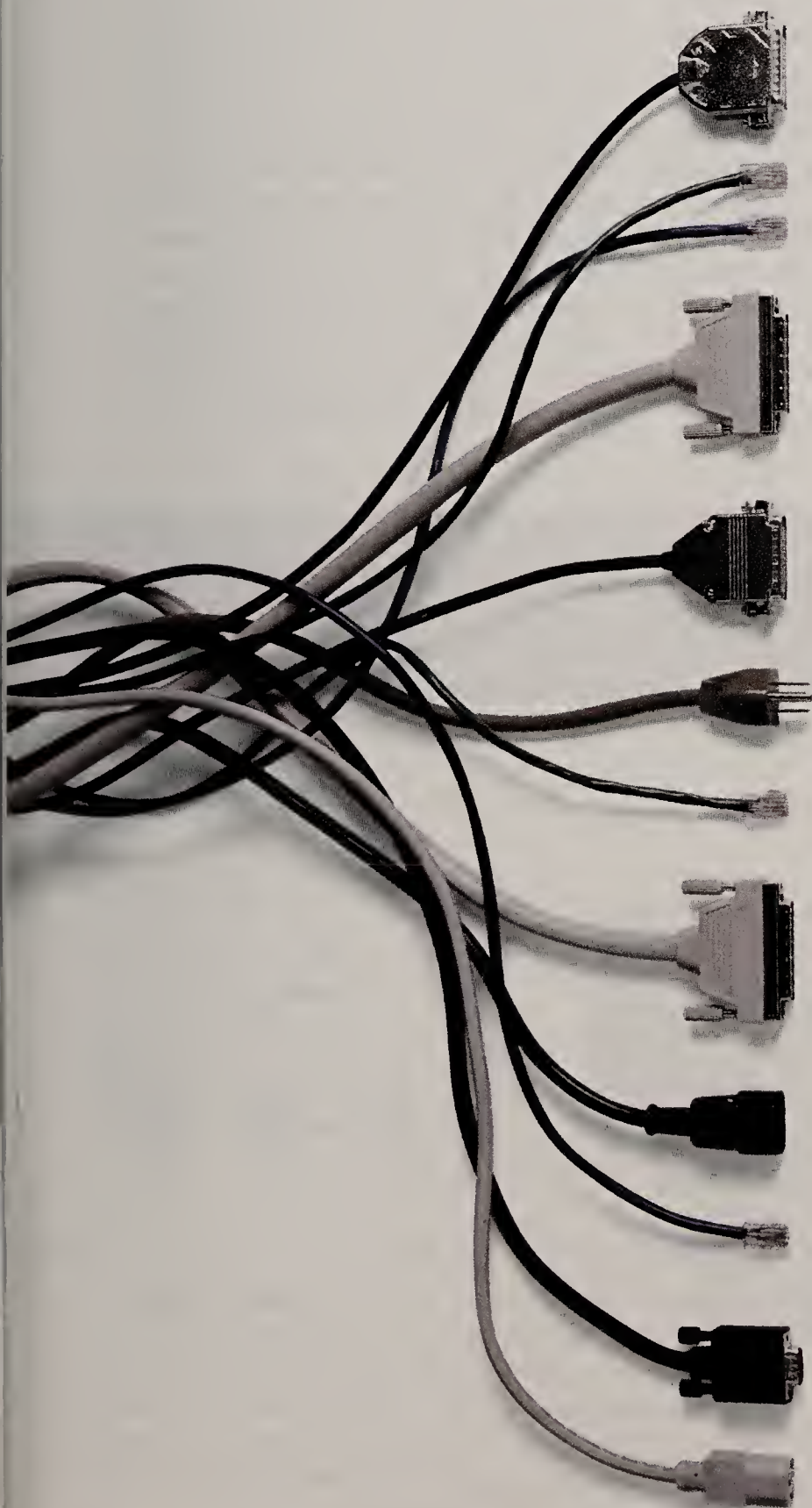


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models and simulate any changes and their impact.

Building a model is a fine start, but what's more important is incorporating cultural change into the organization to change business practices. You have to connect with people within the status quo, then introduce the new practices and reinforce them. The only way I've ever seen this work is when the CIO and CEO are in lock step. Other top executives have to believe in the value of alignment, too, as do the human resources and operations people.

During one of my assignments as a transitional CIO, I worked with a division CEO to define a model that aligned the portfolio of IT projects—hardware, applications, everything—with the vital few division goals. We also tied individual performance to achievement of those goals. As the company outsourced and migrated to a multiple information-supplier environment, the model was robust enough to absorb those changes

**We look at components;
we think up IT strategies
and we propose IT
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and provide business continuity. Coupled with a sound physical architecture and enforceable standards, the alignment model worked well for two years. But when the CEO was reassigned, the new regime did not have alignment as part of its value system, and the model deteriorated.

Ongoing executive team leadership, sponsorship, commitment and participation are mandatory if alignment is to work. Individual agendas can compromise results, so you have to establish a common vision, mission and goal up

front and link them to specific action plans. Functional prototypes that demonstrate business solutions also can be extremely effective.

Role Playing

Executives should also take on a major role in ensuring the success of the alignment model. After all, you exert influence more by what you do than by what you say. The top executive should work with the enterprise model, testing any new products, services or changes inspired by competition against the model to determine the initial impact on areas of the business. The executive should ask, "If I do this, what will change? How does this affect our business model?" For example, if a commercial bank wants to add mutual funds as a product, the model will show either that processes and technologies are in place to support the sales and customer service staff in selling funds or that the bank needs to invest in new tools, process modification and staff retraining.

Great moments in corporate



THE WHIP, 3000 B.C.

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THE MEGAPHONE, 1832

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THE OFFICE MEMO, 1923

The invention of the mimeograph paved the way for the interoffice memo. Distribution was compromised by the medium's considerable lack of speed.



E-MAIL, 1983

Technology seizes the day! Distribution and speed empowered corporate America. However, prioritization concerns were raised as important messages were buried.

Once you achieve alignment and it has been absorbed into the culture, you need to keep it alive by coaching staff members, testing to make sure expectations are being met and inspecting the results. Those techniques should sound familiar because they are common to other change tools and initiatives—such as total quality, reengineering and systems life cycle—that are necessary in the ever-changing business environment.

One of my current clients is an IT and telecommunications solutions provider undergoing a major transformation to a team-based, customer-focused, information-centric environment. The transformation effort is being championed, inspected and guided by the company's leadership team. The top executive is passionate about the transformation and committed to having every person who wears the company ID—full-timers, part-timers, consultants and subcontractors alike—understand his or her role in providing value to the customer.

Alignment is being built into the company's management process in two ways: by linking all technology and business initiatives to individual and team performance evaluations, and by managing the investment portfolio across the three-tier model of people/management, operations and enabling tools.

Alignment: The Next Generation

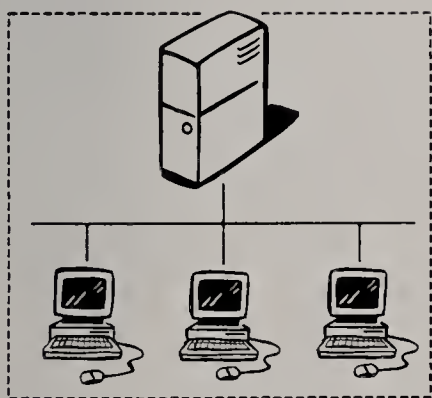
As co-teacher of an entrepreneurship course at Arizona State University, I worked with teams of graduate students who developed business plans for new ventures. The marketing, sales, financial and organizational aspects of the plans were well developed; operational and IT components, on the other hand, were quite limited. Even worse, our text failed to address the need for IT to be an integral part of the business process. Clearly, the concept and value of business-IT alignment must be a consistent part of formal business education. We need to use case studies and projects to reinforce

that concept, or a generation of new business leaders will be unable to use information technology effectively to achieve their business goals. They'll be playing catch-up just as many businesses and corporations today are.

To make business-IT alignment a true linking, executives must integrate the business's people, processes and enablers into their business process and practices. The CIO must be seen as a trusted adviser to work effectively with all stakeholders to design and implement an adaptive enterprise model. The road to business-IT alignment starts with executive leadership commitment, sponsorship and active participation through what will be a major transformation. **CIO**

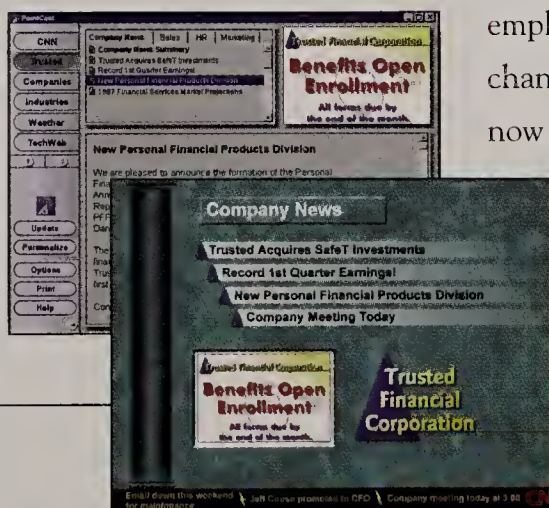
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Consolidating common functions (from left): Larry Kittelberger, Larry Bossidy and Daniel Henderson

Reader ROI

AS LARGE COMPANIES LOOK TO leverage common systems and processes among multiple business units, many take the shared services approach. This feature will show you the benefits and challenges of shared services and how it affects CIO and IT organizations.



Share & Share Alike

The time is right—and so is the technology—for CIOs to consider introducing their organization to shared services

BY TOM FIELD

WHEN CEO LARRY Bossidy took the helm of AlliedSignal Inc. in 1991, it was easy to see how the Morristown, N.J.-based manufacturing conglomerate could benefit from consolidating redundant practices. With three major business sectors and 32 strategic business units worldwide, the company was rife with duplication: 17 North American data centers, 32 different ways to calculate overtime pay, 150 separate pension plans. No question, AlliedSignal could enjoy great efficiency and economies of scale by merging some of those common functions and integrating them across the global enterprise.

Bossidy opted for an approach that was just catching fire among corporations of similar size and scope: shared services. Its premise is that decentralized companies can cut costs, reduce head count and improve underlying processes and customer service by centralizing their nonstrategic administrative functions. His solution was to create a new business unit that would encompass AlliedSignal's disparate financial, human resources and IT functions and in turn provide those services at lower cost to the other business units.

Ultimately, Bossidy's shared services dream was realized. Since 1994, the AlliedSignal Business Services organization has consolidated 75 separate business functions under one organizational umbrella. As a result, 1,000 employees do the work formerly done by 1,600, and the company estimates it reaps an annual savings of \$70 million (see "All's Well With AlliedSignal," Page 54). But the gains hardly came without pain.

Transition teams consisting of reps from the cross-functional group that would become AlliedSignal Business Services spread to the remote offices in 1993 to help business units migrate to the new unit. But the so-called perfect solution became a major problem for some rank-and-file employees, who actually barred some teams from their buildings. It wasn't that the employees didn't care about economy and efficiency; they were scared they would lose their jobs.

Such is the quandary of implementing shared services: In theory, no one can argue with the benefits of consolidating common functions; in reality, you're talking about changing organizations and processes

that people embrace even more dearly when they feel threatened.

"The implementation of this stuff is not at all easy," says Daniel G. Henderson, vice president and general manager of AlliedSignal Business Services. "A lot of companies give up the fight because it doesn't seem worth it to them. We bulled our way through, and as a result, we think we've improved our processes."

Elsewhere, the stories are similar to AlliedSignal's. In 1995, Greenwich, Conn.-based manufacturer Tenneco launched Tenneco Business Services (TBS) to provide human resources, finance, IT and other common functions for Tenneco's North American operations. Today, the company projects a three-year cost savings of \$120 million (see "Tough Times at Tenneco," Page 51). Likewise, New York-based financial services giant American Express Co. has shifted many of its corporate functions to a shared services model. The Travel Related Services unit, which administers the company's charge and credit cards and travelers checks, in 1995 consolidated 85 separate back office financial operating centers into three major financial resource centers that to date have saved \$80 million (see "Charging Ahead at American Express," Page 56).

"But don't expect anyone to say, 'Goody! Shared services! Let's do it,'" says AlliedSignal CIO and Corporate Vice President Larry Kittelberger, who happened to be CIO at Tenneco when it first explored the idea. The IS team, like its business-side counterparts, often will resist shared services, fearing that it will lose control of IT or asserting that it can manage a data

center or wide area network better than any central organization can. To counter that resistance both within and outside of IS, companies must stick doggedly to their shared services agenda and communicate openly so that employees know exactly how, when and why their jobs will change—and how the organization will improve as a result. Says Brian Sommer, head of Andersen Consulting's Chicago-based shared services practice, "Shared services is something you want to do with people, not to them."

Shared Services: The Early Years

Shared services entered the corporate lexicon in the early '90s as large, decentralized companies looked to combine basic transactional processes such as payroll, purchasing and accounts payable, and sell back those services at cost to the individual business units. The concept was no epiphany: Cost-cutting by pooling cooperative resources wasn't a new idea. But the business process reengi-

Gimme Gimme

When shared services initiatives fail, says Leland I. Forst, CEO of The Amherst Group Ltd., in Greenwich, Conn., the failure generally stems from any of these three factors:



NO BUY-IN:

Corporate executives fail to include business units in the planning stages of shared services.

NO BASELINE:

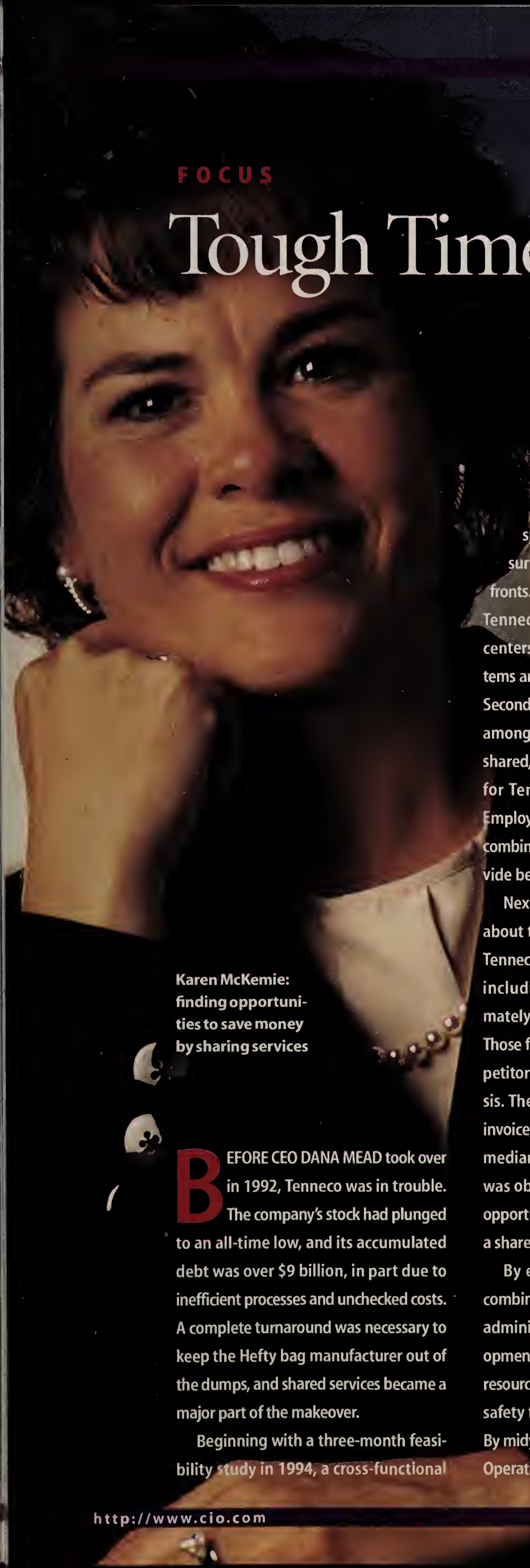
Companies tout customer service as a priority but then fail to establish baseline metrics with which to measure the success of shared services.



NO BIG PICTURE:

The shared services organization's success is gauged solely on its ability to continue cutting costs. "That's a death spiral," Forst says. "There is no upside to that; it's like being anorexic: How thin, how small, how weak can you become?"





FOCUS

Tough Times at Tenneco

Karen McKemie:
finding opportunities to save money
by sharing services

BEFORE CEO DANA MEAD took over in 1992, Tenneco was in trouble. The company's stock had plunged to an all-time low, and its accumulated debt was over \$9 billion, in part due to inefficient processes and unchecked costs. A complete turnaround was necessary to keep the Hefty bag manufacturer out of the dumps, and shared services became a major part of the makeover.

Beginning with a three-month feasibility study in 1994, a cross-functional

management team surveyed more than 300 employees throughout Tenneco's six divisions to ascertain which functions they had in common, which could be shared and which should remain unique and specific to individual divisions. The survey results were shocking on two fronts. First, it was glaringly obvious that Tenneco supported six individual data centers, 20 to 30 accounts payable systems and more than 100 payroll systems. Second, "there was surprising agreement among everybody about what could be shared," says Karen McKemie, head of IT for Tenneco Business Services (TBS). Employees sincerely believed they could combine some of their functions and provide better, cheaper service to Tenneco.

Next, the study group gathered data about the cost of doing business within Tenneco from purchase order to invoice, including the number of people ultimately involved in a given transaction. Those findings were compared with competitors' costs in a benchmarking analysis. The results: Just to process a single invoice, Tenneco was spending twice the median of what its competitors did. "It was obvious that we had an enormous opportunity to save money by moving to a shared services model," McKemie says.

By early 1995, Tenneco decided to combine its disparate employee benefits administration, finance, supplier development, information technology, human resources, and environmental, health and safety functions within a new unit, TBS. By midyear, Tenneco VP of Shared Service Operations Matt Appel was named pres-

ident of TBS, whose headquarters is just outside Houston in The Woodlands, Texas. Later in 1995, TBS went live, combining the six data centers and began work on consolidating the duplicate payroll and finance systems. Ultimately, Tenneco expects TBS to employ 365 people, who will perform the work previously done by 650, at a projected three-year cost savings of \$120 million.

One of the first "quick wins" of shared services came from the supplier development program, which negotiates enterprisewide vendor contracts with Tenneco's suppliers. Xerox Corp., for example, has contracted to buy, replace and service 1,200 of Tenneco's copiers in North America, while Rosenbluth International Inc. in Philadelphia, has signed on to be Tenneco's corporate travel agency. Arrangements such as these, as well as similar deals for utility rates and other business services, are expected to net tens of millions of dollars in annual savings.

Because Tenneco communicated openly about shared services from the start and continues to through a quarterly employees newsletter "Serviceline," which updates TBS progress, the company was able to avoid a lot of the turf wars common in shared services initiatives, McKemie says, but there remain challenges. Namely, now that TBS has been rolled out in North America, can Tenneco take the show on the road to Europe and Asia? "We've got to the point where we have a foundation set of services," McKemie says. "The challenge now is how we leverage that investment of shared services."

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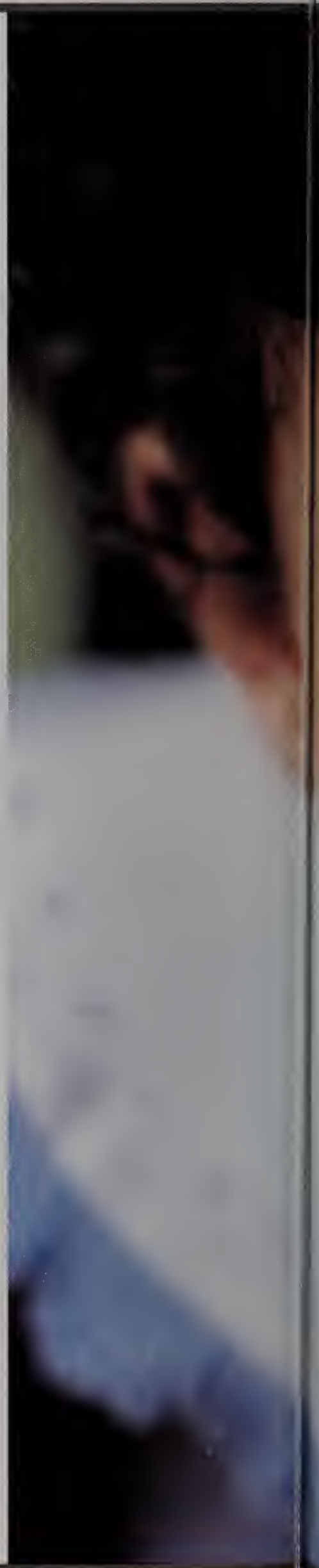
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COMPETITIVE STRATEGIES

neering movement and the evolution of desktop and networking technology made it possible for companies to link remote business units within a central information system. More recently, the advent of such popular enterprise resource planning tools as those from SAP AG, Oracle Corp. and PeopleSoft Inc.—packaged software applications that force process standardization—have created even greater impetus for shared services.

While critics argue that shared services is just a new way to describe the centralized organization, some analysts disagree. "This is not centralization; it's commonization," says Tim Longnecker, partner in Deloitte & Touche Consulting Group's Detroit office and leader of the shared services practice. The

difference, according to Longnecker, is that a centralized organization answers to corporate dictates, whereas a shared services organization is beholden to the internal business units, which often have the corporate blessing to shop elsewhere if the shared services unit can't deliver the goods better or cheaper than an external provider.

In that light, shared services resembles outsourcing. Both approaches force a company to examine the causes and effects of removing nonstrategic functions from the business units, but with shared services, the work typically is rerouted internally instead of sent to an outside vendor. As a company moves to shared services, management sees what it actually costs to provide these services, and in many cases, a company will

FOCUS

All's Well With AlliedSignal

PRIOR TO ITS MOVE TO SHARED services, AlliedSignal's 32 strategic business unit IS directors managed 17 data centers and countless, non-standard information systems within 40 countries. There was a corporate IS director, "but he didn't really have the authority to make things happen in a centralized way," says Daniel G. Henderson, vice president and general manager of AlliedSignal Business Services. "Now the CIO is a strong person with a strong vision."

That person is Larry Kittelberger, who came to AlliedSignal from Tenneco in 1995. He now heads the company's IS council, which includes the CIOs from the sector networks and Business Services. Data centers and wide area networks no longer are part of the IT organization's purview; those have been shifted to Business Services. But from Kittelberger's perspective, the restructuring is a relief. "It keeps me out of the day-to-day data center, and I can act more strategically," he says, "as opposed to worrying about whether the file server's gone down and who's going to fix it."

Not all IS professionals welcome shared services so openly, particularly with the loss of the WAN. "The WAN, for a tech person, is

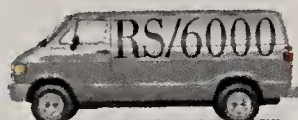
where the fun is," Kittelberger says. "It's hard to convince IS people that they'd be better off spending their time with application development." But in time, these employees have come to realize that it also is fun to think in terms of "How do I move the business forward with technology?" says Kittelberger.

Because AlliedSignal business units can seek service externally if Business Services doesn't meet their needs, customer service is given top priority. To ensure customer satisfaction, Business Services spends a significant amount of money on customer service training. "A lot of these people haven't thought of themselves before as serving customers," Henderson says. "It requires a lot of training in service levels and metrics."

Business Services issues annual customer satisfaction surveys that rate service on a scale of 1 to 5, looking at such areas as accessibility, responsiveness and reliability. In 1995, Henderson says, the overall satisfaction rating hovered around 3.5 but the 1996 survey rose to 4.0. "Typically, what we find," Henderson says, "is that we overestimate how satisfied our customers are and underestimate how important our services are to them."



Larry Kittelberger: staying out of the day-to-day data center and acting more strategically



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outsource certain functions (see "Looking Inward Before Outsourcing," Page 60).

Today, the shared services focus is shifting away from cost reduction and more toward economies of scale and improving customer service, analysts say. At AlliedSignal, where each business unit used to arrange its own real estate deals, Business Services now provides a "center of expertise" that arranges all corporate real estate transactions. And at Tenneco, where TBS negotiates enterprisewide purchasing contracts and utility rates, the deals are mutually beneficial. Tenneco saves money by buying in bulk, while the vendors have a single point of contact for payment processing to Tenneco. "Different companies have different definitions of

how much sharing they're going to do," says Andersen's Sommer. "If people think shared services is just [aimed at] squeezing efficiencies and benefits out of \$20,000-a-year clerks, then they're not looking at this in the right light."

The IS Challenge

At minimum, the IT organization can help implement shared services—selecting, deploying and enforcing common information systems. But at companies such as AlliedSignal and Tenneco, the data centers and desktop support actually are removed from IS and placed in the shared services organization. The good news for IS is that the restructuring eliminates some of the more mundane maintenance functions of the

FOCUS

Charging Ahead At American Express

AT AMERICAN EXPRESS, located at the World Financial Center in New York, shared services has become a way of corporate life.

Taking the lead from Chairman and CEO Harvey Golub, American Express in 1992 began a corporate restructuring to transform the multifaceted organization from a holding company of autonomous subsidiaries to an operating company of integrated units. Shared services became a part of the transformation, as American Express sought to extend centralized skills and services among its three major business units, Travel Related Services (TRS), American Express Financial Advisor and American Express Bank.

But rather than create an independent shared services unit, American Express became a shared services organization, providing common staff functions (in finance, human resources, general counsel and public affairs) and support functions (in technology and advertising) as "centers of excellence" serving the entire corporation.

In 1995, TRS created three Financial Resource Centers (FRCs) that consolidate the company's worldwide transactional processes in three global sites. John McDonnell, chief financial officer of TRS, rattles off the statistics that made the business case for consolidation: 85 separate financial centers staffed by 20 to 30 employees each serving the various TRS businesses; 13 separate payroll systems in the United States alone. "Everybody was doing their own thing their own way, using their own technologies, processes and procedures," McDonnell says. "We were operating in a less-than-desirable manner."

TRS consolidated many of its procedures and processes—credit card authorization, accounts payable, general ledger—into Financial Resource Centers in Phoenix; Brighton, England; and New Delhi, India. So far, McDonnell says, the FRCs have saved \$80 million and reduced staff by 1,000 employees worldwide.

The American Express IT organization maintains an ongoing presence within the

Financial Resources Centers, with microsystems teams responsible for managing local IT needs. As a result, IT and business managers alike feel a greater sense of kinship. "The wall has come down," says Charles G. Schwab, vice president of global financial technology. "Our IT people now feel they can sit in the same room with [the business people], have lunch with them, interact with them. They're enjoying it."

One result of this collaboration is a new bank-account reconciliation system created recently in Phoenix and is being rolled out in all three FRCs. "The users actually sat down with the microsystems team and mapped out an ideal system," says David Overmyer, vice president of distributed systems in the TRS finance organization. "Before, the idea would have taken a lot longer to boil up. Now users don't just take an idea and throw it over the fence to management and hope management runs with it," he says. "They can actually see it get built and used within their own centers."

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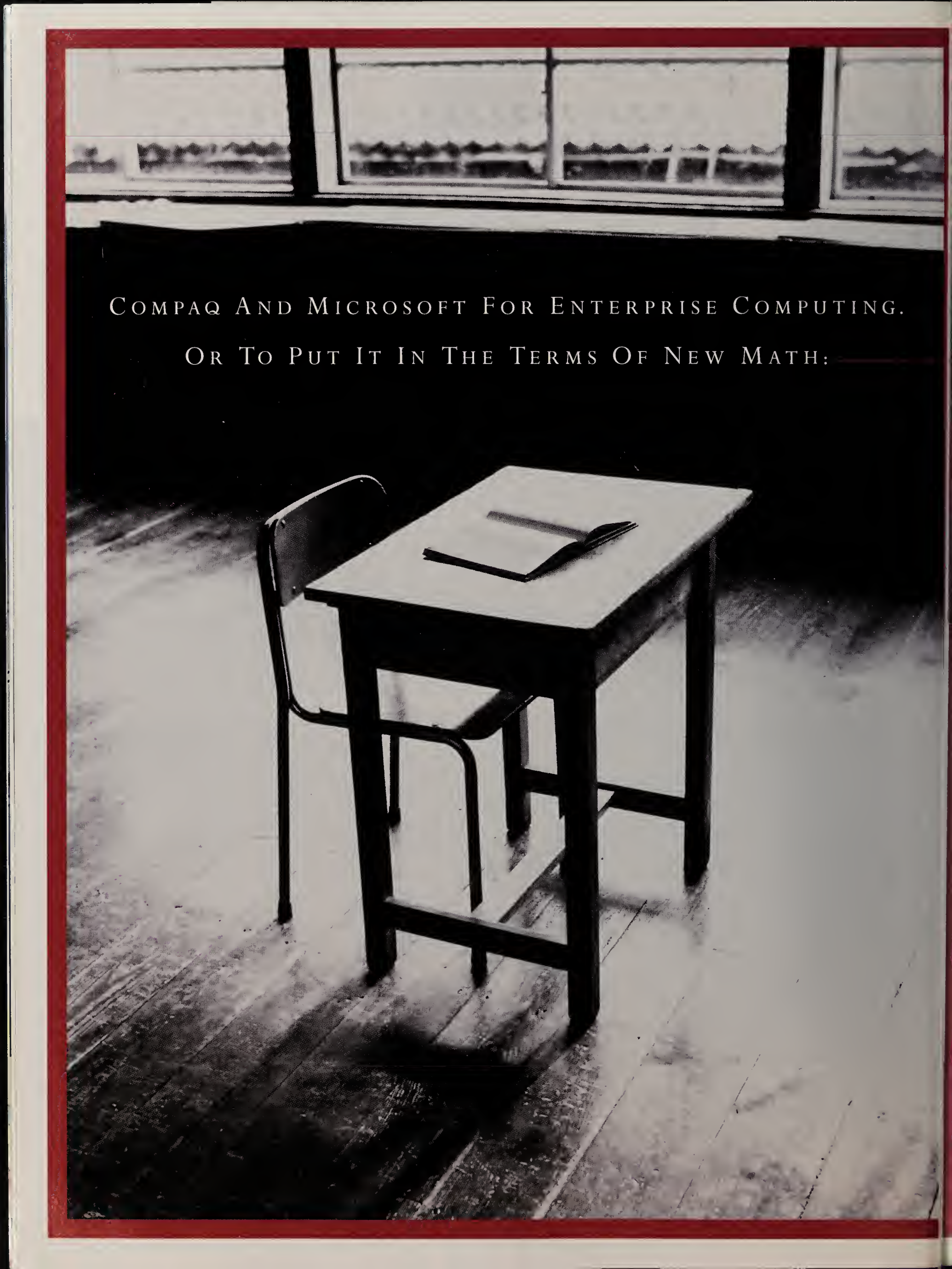


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A black and white photograph of a study desk and chair in front of a large window. The desk is a simple wooden table with a chair tucked under it. On the desk, there is an open book and a pen. The window in the background shows a view of a building and some trees. The text is overlaid on the dark area of the desk.

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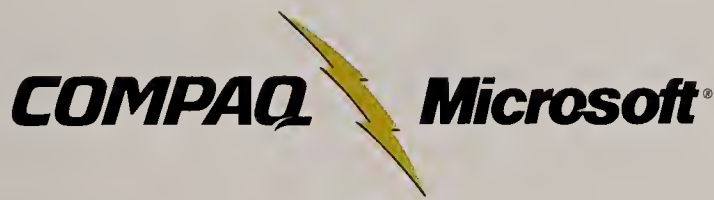

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IS department; the bad news is that the IS staff, freed to focus on more strategic needs, must develop better business and communications skills and learn more about newer technologies such as networking, EDI and the Internet. Sometimes those challenges result in retraining, sometimes in restaffing. Either way, James Aselta, a New York-based partner in the U.S. shared services practice for Ernst & Young LLP, sees the change as an opportunity, not as an obstacle. "Shared services is a chance to get out in the forefront of business and begin thinking strategically about systems—common systems," Aselta says. "For many IS people, shared services plays into what they've been saying they wanted to do for years."

When shared services is in place, IS also can help organizations meet their greatest external challenge—globalization. In Europe, regulations limit how data moves across borders, and strong labor unions inhibit companies that want to move employees between countries. In Asia, a major issue for companies that want to leverage shared services globally is telecommunications infrastructure—or the lack thereof. To alleviate those problems, IS departments at AlliedSignal and other companies have helped their organizations create country centers of shared services—small country-specific organizations that mirror and report back to the greater shared services organizations—in Europe, while in Asia they have either helped build the necessary infrastructure or encouraged partnership with local companies engaged in that construction.

Beyond Shared Services

"Virtual shared services" may arise as Internet technology creates a vehicle for companies to consolidate functions and systems at multiple sites without physically combining systems or staff. Or multiple companies may even share shared services. AlliedSignal Business Services already has been approached to run payroll for several external companies, Henderson says, but his organization is not ready to take on that role. Tenneco already provides data center support for Newport News Shipbuilding, a former Tenneco business unit in Newport News, Va., and TBS management is weighing whether shared services can become a successful commercial venture.

No one says shifting to shared services is easy. The larger and more diverse the company, the longer shared services takes to implement, and the more it costs. But for the companies that have seen it through, shared services has borne impressive results. "The first years are very emotional; you're going against the grain, no question," says AlliedSignal's Kittelberger. "But in the end, it comes down to dollars and cents. I know shared services is good because I've done it, and it works." **CIO**

Staff Writer Tom Field can be reached via e-mail at tfield@cio.com.

Looking Inward Before Outsourcing

Although it's sometimes referred to as "insourcing," the shared services approach need not exclude outsourcing

ALLIEDSIGNAL INC., whose AlliedSignal Business Services administers a \$300-million-per-year shared services operation, uses its shared services methodology to determine just how much it costs to provide a particular service and whether that service can be provided better and cheaper internally or by an external vendor. "Shared services is probably one of the best steps to prepare yourselves for outsourcing," says AlliedSignal CIO and Corporate VP Larry Kittelberger. "Get all your costs down first and then see if anyone else can beat it."

Already, AlliedSignal has outsourced its desktop computer support and help desk functions, however few of the other shared services has been outsourced. If that eventually does happen, Business Services will manage the outsourcing relationship for AlliedSignal.

Tenneco, too, has used shared services as a means of determining cost of service, says Karen McKemie, head of IT at Tenneco Business Services. So far, Tenneco has outsourced benefits delivery and relocation services to low-cost vendors, and other services are reviewed regularly.

Shared services works best when a company's business units have the option of outsourcing, says Leland I. Forst, CEO of The Amherst Group Ltd., a Greenwich, Conn., shared services consultancy that has specialized in shared services since 1991. "Otherwise, it's just centralization in disguise," Forst says, "a wolf in sheep's clothing." —T. Field

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Up

Close

New technologies may facilitate data collection and dissemination, but they also enable behavior that violates many consumers' sense of privacy

BY JENNIFER BRESNAHAN



**Turning
Data into
Dollars**
part two

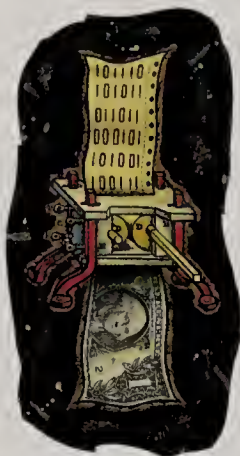
LOOKING DOWN AT THE COMPLIMENTARY PACKET of seeds he'd just received from *Smithsonian Magazine*, Ram Avrahami shook his head and walked from his mailbox back to his gardenless apartment in Arlington, Va. For years,

Turning Data into Dollars

Part One of this series (The Data Game," *CIO*, May 1, 1997) looked at the term "information exhaust" and what it means for companies looking to turn their data into new products.

Part Two, this feature, examines the pitfalls companies can fall into when they violate customers' privacy by selling data.

Avrahami, a sales manager of a large telecommunications company, had tried to stop the ceaseless flow of unwanted mail he'd been



Turning Data into Dollars

part two

receiving, but to no avail. Finally, as an experiment, he misspelled his name on a subscription for *U.S. News & World Report*. Sure enough, the name on the mailing label from *Smithsonian* included the same misspelling. That was the breaking point for Avrahami, who, in collaboration with Private Citizen Inc. (www.ctct.com), an anti-junk mail advocacy group, is fighting for consumer protection from junk e-mail. Unlike most people, who eventually give up the good fight against junk mail, Avrahami decided to take his grievance against *U.S. News* to court. "The mailing itself was not the real problem," he says. "I just didn't want anyone to sell my private life without my permission."

Avrahami lost the case. The court ruled that it is not illegal for companies to collect, analyze and sell data about their customers. But companies would be wise to view *Ram Avrahami v. U.S. News & World Report Inc.* as a warning. Consumers are beginning to understand the value of their personal data and may soon reclaim ownership of it—or at least demand higher levels of service (or some cash) in exchange. And their discontent is attracting the attention of legislators eager to protect consumers from unethical business practices. In the meantime, individuals and watchdog groups are patrolling for and summarily punishing what they deem to be unethical corporate behavior in this area. Even if people's complaints never get to the courtroom, the ruckus they raise can create a publicity nightmare for companies that results in lost business.

Companies with extra-sharp radar already understand those potential pitfalls of information commerce, though they are understandably reluctant to abandon the new market opportunities it presents (see "The Data Game," *CIO*, May 1, 1997). The CIO's role in this process is to implement and maintain the systems to collect, store and protect consumer information as well as to guide the company's ethical strategy.

"This is a values issue versus an equipment issue," explains Jeffrey F. Rayport, assistant professor in the Service Management Group at the Harvard Business School. "CIOs aren't used to thinking about their roles that way. If you get it right, you'll learn more and can deliver better value. But if you get it wrong, you're shut out of a dialogue with customers that could teach you about how their tastes and preferences are evolving over time. The stakes here are huge."

Easy Access

The first lesson companies learn in this new information arena is that where personal data is concerned, people prefer to play hard-to-get. Consumers have vehement reactions to any product that makes personal information readily available or accessible to a wide audience—even if that data is already found in less convenient public sources. They hate the idea



that anyone with a computer and a modem can gain access to information about them. For instance, although many online databases are composed mostly of information already available elsewhere—in the white pages or from market research compa-

Jeffrey Rayport: *If you get your data policies right, you'll learn more and can deliver better value. If you get them wrong, you're shut out of a dialogue with customers.*

nies—many consumers are spooked to discover that their Social Security numbers are available over the Net.

Lexis-Nexis learned that lesson the hard way when in 1996 it released the P-Trak Personal

Locator containing information about 300 million people, including telephone numbers, addresses and Social Security numbers. Subscribers to Lexis-Nexis's private library could access the information for about \$85 a search, says Lexis-Nexis Public Relations Manager Judi Schultz in Dayton, Ohio. The company sent out a marketing message and was soon flooded with calls and e-mail from people requesting to have their information removed from the database. Six days later, public outrage compelled Lexis to remove Social Security numbers from the product, even though the same information always had been available through the mail from the International Research Bureau Inc. in Tallahassee, Fla.

Lotus Development Corp. of Cambridge, Mass., experienced a similar public flogging in 1990 when it released Marketplace, a CD-ROM product containing individual names, addresses and phone numbers. All the information in Marketplace was obtainable previously from U.S. Census Reports or market research companies, but consumers reacted when they realized how universally—and easily—accessible the Lotus product made their personal data. Lotus was inundated with nearly 800 phone calls a day until the negative publicity helped push Lotus to sell off the product technology in 1991 to IMarket Inc., says Douglas C. Borchard, president of IMarket and former product manager at Lotus. Eventually, IMarket executives decided that they, too, would stay away from databases connected with consumer information, instead offering databases containing only profiles of U.S. companies. The company has no immediate plans to hazard the consumer realm again, Borchard says.

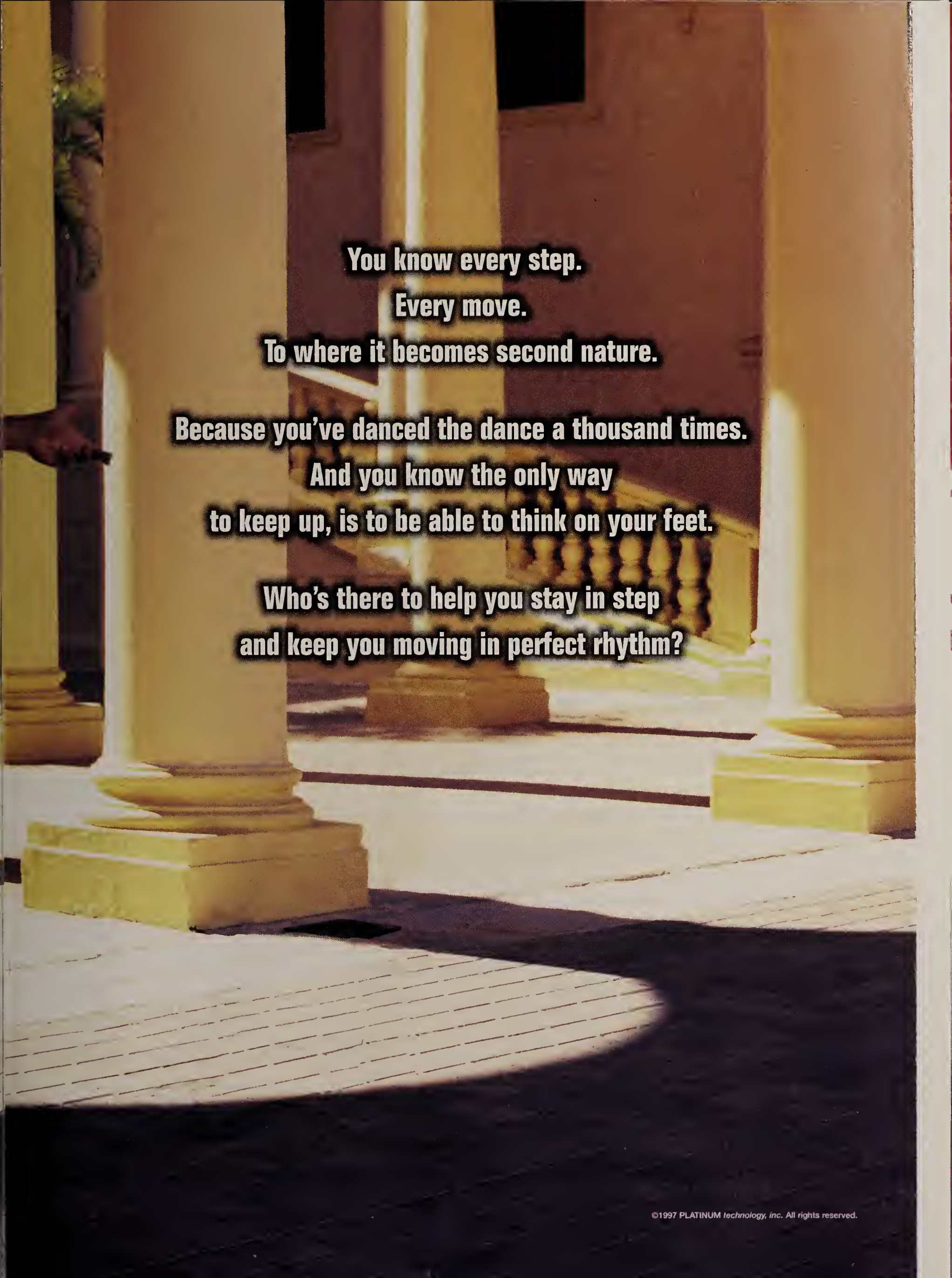
Online Offenses

Poor netiquette can also cause customer revolt. Gathering information on people through the Web without telling them is a sure-fire way to get them miffed. The notorious cookie technology, for example, which tracks a user's actions on the Web, has practical applications, but companies employing it often don't inform the people being tracked, says Stanton McCandlish, program director for the San Francisco-based Electronic Frontier Foundation. Similarly, the "stealth software" used by Microsoft Corp.'s Registration Wizard caused a public uproar in 1995 by automatically collecting information about customers' systems without their knowledge or permission, Rayport says. When Windows 95 users registered online, Registration Wizard inventoried users' PCs and all the major software prod-

"Customers are becoming aware that companies are generating profitability based on their personal information."

—Jeffrey Rayport





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**And you know the only way
to keep up, is to be able to think on your feet.**

**Who's there to help you stay in step
and keep you moving in perfect rhythm?**



Turning Data into Dollars *part two*

ucts running on their systems. Microsoft stopped the practice when people got wind of it and rallied against it.

Another netiquette faux pas includes sending mass-marketing e-mail. Consumers on the Web guard their privacy fiercely and don't take kindly to being tracked, cataloged and marked. Junk e-mail is one of the biggest peeves of people on the Internet, says Barry Fraser, staff counsel for San Diego-based consumer watchdog group Utility Consumers' Action Network. "People who have been on the Internet for more than two or three years tend to think of the Internet as their own little community," explains Joel McNamara, an Internet security consultant and principal at CPS in Seattle.

Most lawyers agree that U.S. citizens have no legal recourse when they feel that a company has disregarded their privacy rights online, although the junk fax law, enacted to prohibit advertisers from sending unsolicited faxes, is extendible to direct marketing on the Internet, according to Pleasanton, Calif.-based attorney Mark J. Welch. No company sending junk e-mail has been tried on

the basis of this law, he says, because "they're mostly fly-by-night operations with no assets." What consumers do have on their side, however, is the power of the word. "A single grudge page can hurt a company in ways that far exceed the value of what it's done," says Welch. In addition to personal vendetta pages, a plethora of organized sites exist to slam unethical business practices, such as non-profit consumer organization CyberCop Precinct House (www.ucan.org) and watchdog page Blacklist Internet Advertisers (www-math.uni-paderborn.de/~axel/BL).

No company has been more widely denounced for sending marketing e-mail than Cyber Promotions Inc., a Philadelphia-based bulk e-mail service. Cyber Promotions was the target of a lawsuit led by America Online Inc. and of many grudge pages, including one created by Welch. (The AOL case was settled in early February with both sides mutually releasing each without any monetary damages.) "If you send me junk e-mail, you are engaged in what I believe to be an unethical behavior," Welch explains. "It irritates and harasses me. Therefore,

Let the Seller Beware

*Sometimes selling
customer data can be
risky business*

ONE OF THE MORE COMMON pitfalls for companies collecting consumer data is that the data they sell has the potential to expose their customers to harm or danger. For example, in 1995, consumers loudly protested a database of information that Metromail Corp., a Lombard, Ill.-based direct mailing subsidiary of R.R. Donnelley & Sons Co., collected on the hobbies, addresses, preferences and health of 1.3 million children in California. The concern was that pedophiles would use the database to target children—a fear that was fanned when a television reporter in Southern California managed to order private information on 5,500 kids in the Los Angeles area, using the name of a convicted

child-killer, a phony business name and a fake telephone number.

Metromail's practice of hiring felons in a Texas prison to do data entry also has put consumers at risk. In 1994, a convicted rapist memorized an Ohio woman's personal data and wrote her a threatening letter. The woman proceeded to trash the company, appearing on talk shows such as Geraldo Rivera's, according to Marc Klaas, president of the Klaas Foundation for Children in Sausalito, Calif. Her lawsuit against Metromail is pending. As a result of those controversies, Metromail's chairman and chief executive retired and R.R. Donnelley relinquished control of Metromail when it went public in spring 1996.

Even companies that don't make their databases available to the public can put consumers at risk through hacker activity and employee error. In 1996, for example, an employee at a Florida research organization was careless with a disk containing the names of thousands of AIDS patients in the region. The file made its way to the local newspaper, whose decision

not to print the list saved the organization many a lawsuit, according to Linda L. Kloss, CEO and executive vice president of the American Health Information Management Association in Chicago.

In addition, the danger is compounded by the presence of so many different databases in one place, says Joel McNamara, an Internet security consultant and principal of CPS in Seattle. Anybody can now run a query to get an individual's name and address—and then bring up a mapping application to draw a map to that person's front door.

Those who may have expressed objections to what marketing professionals could do with that information are drawing the line when they imagine the same information in the hands of less savory characters. "Now Joe Blow in his garage can see the same information, without any of the same assurances or discipline of the marketplace," says Jeffrey F. Rayport, assistant professor in the Service Management Group at the Harvard Business School.

—J. Bresnahan



Mark Welch: *Sending unsolicited e-mail not only irritates customers, but it is probably also against the law.*

I will not do business with you, and in fact, I will put up a page that does a lot of damage.” Welch claims that other companies using Cyber Promotions are also blacklisted by consumers, although Bob Roberts, vice president of marketing at Camelot Music Inc., insists that the retail music company’s use of Cyber Promotions to announce the launch of its CD Genie site in 1996 provoked very few complaints from consumers.

Solutions Providers

Many companies are drawing up guidelines to steer their excursions into the jungle of information commerce. One approach is to avoid the issue altogether, as West Chester, Pa.-based cable shopping service QVC Inc. has done. QVC refuses to sell to other merchants any of the information it has collected on more than 60 million U.S. households. In fact, QVC won’t even use the information for its own direct marketing purposes because it doesn’t want to risk offending customers, says Ellen Rubin, QVC’s vice president of public relations.

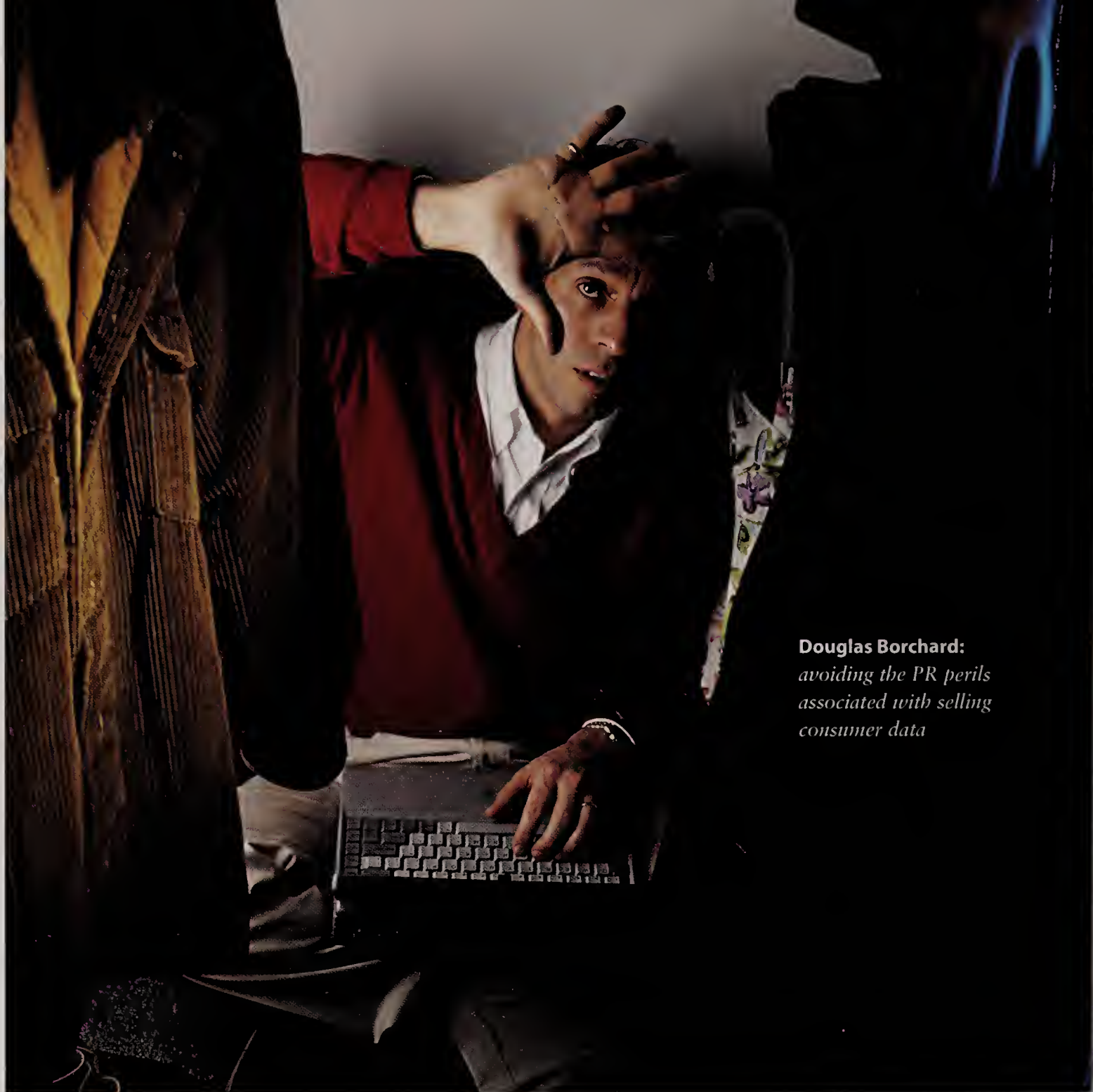
Other companies are trying to fix the problems internally so they can continue to use and benefit

from consumer data. Conway, Ark.-based information technology and management services provider Acxiom Corp., for example, has created a detailed policy statement reassuring customers that their data will be treated respectfully by Acxiom. Since the Registration Wizard fiasco, Microsoft has pledged to adhere to the stricter European Community Privacy Directive (see box, Page 74).

On a broader level, many industry groups and trade associations are also working on solving the problem before the government gets involved. For instance, the Direct Marketing Association Inc. (DMA) in New York has written draft principles for online marketing, focusing on the idea of letting customers opt out of a database or mailing list. Another industry endeavor is ETrust, an online transactional security and privacy project launched in the beginning of this year by a group of Internet and electronic commerce pioneers. Designed to provide online merchants with a clear set of standards and guidelines and to bolster public confidence in Internet commerce, ETrust rates how well merchants inform consumers about the privacy and security consequences of an online transaction.



Turning Data into Dollars *part two*



Douglas Borchard:
*avoiding the PR perils
associated with selling
consumer data*

"We believe that self-regulation provides the flexibility to adapt to changing marketing conditions, technology trends and consumer behavior and attitudes," says Chet Dalzell, a spokesman for the DMA. "If we're not effective, the alternative is undermined consumer confidence in the medium, so we have every reason to make sure this works."

The effectiveness of these self-regulatory measures remains to be seen. Currently, few companies let consumers choose to opt out of lists despite the DMA recommendations that they offer the choice, McNamara says. Moreover, Avrahami asserts that simply letting customers opt out after the fact isn't enough. Instead, he says, companies should include only those who specifically opt *in*. That way, consumers will be sure to get what they want, and companies will retain the privilege of using their data.

If companies don't quickly align their interests with consumers', the government should require them to at least provide a choice to opt out, says Beth Givens, project director of the Privacy Rights Clearinghouse in San Diego. But most business groups want the government to wait for the technology to mature, giving the industry time to solve these problems itself. "When the government gets

involved, it doesn't understand the technology, and that usually ends up in bad laws that won't solve anything," explains McNamara. "Technology will always outpace legislation."

For example, bills such as the Consumer Internet Privacy Protection Act of 1997 would do more harm than good, McCandlish says. The bill would regulate what an interactive computer service can do with a subscriber's personally identifiable information, "but it applies only to Internet service providers, and that's not really where most of this information is generated," McCandlish explains. "It's generated by the Disneys or Time Warners, and this law would not cover them." Furthermore, the bill mandates that a company get prior written consent from people before touching their data. "That's just not practical. You can't say, 'Sorry, you can't use this Web page until you mail, via postal mail, a signed form.' That would be really harmful to online commerce," McCandlish says.

Individual states are also looking at passing laws to guard consumer privacy in the electronic age. But bills currently under debate, such as the Nevada state Junk E-mail Bill, which seeks to prohibit sending unsolicited e-mail for commercial purposes,

with data located behind a variety of different operating systems—NT, UNIX, MVS. The key thing we're trying to do is pool that data together from all sources and create information out of it. We researched the market a great deal to help us develop this new information archi-

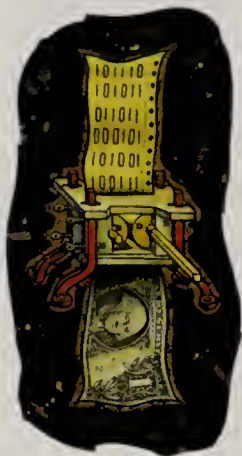
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Turning Data into Dollars *part two*



Beth Givens: *The government should require companies to provide consumers with a choice to opt out.*

"are just noise," says McCandlish. "If we get a whole bunch more of these, it could cause a real problem. Every state will have its own Internet law. It's a mess waiting to happen," he says. "States need to hold off on making rules for a medium that no one understands yet."

Perhaps the smartest companies are those making customers happy, so they don't go running to

complain to the government in the first place. Berkeley, Calif.-based online advertising and marketing service CyberGold Inc., for example, monetarily compensates people for reading ads on the Web. That kind of approach, of course, necessitates a bigger marketing budget.

"The information that feeds database systems historically has been considered free goods, as long as you could fund the creation of an information infrastructure," says Rayport. "Customers are becoming aware that companies are generating profitability based on their personal information. The combination of this rising awareness—the privacy issue and the diffusion of technology into businesses and homes that allows them to control the dissemination of information about their own behavior—means consumers are going to be in a good position. If you're a CIO and customer data is your life business, you're going to have to start budgeting for this."

"Personal information is worth money," Avrahami explains. "The short-term interest of businesses is to confiscate that value and sell it for profit. In the long run, businesses will benefit from sharing the value with consumers rather than trying to take it for themselves." **CIO**

Staff Writer Jennifer Bresnahan can be reached at jbresnahan@cio.com.

Sprechen Sie Data Laws?

THERE MAY BE FEW U.S. LAWS REGULATING BUSINESS ON the Web, but U.S. companies operating outside the United States should be aware that the same is not true of other countries. The European Community has developed strict data privacy laws in the European Community Privacy Directive.

"Say you've got a Web site out there and are collecting information from individuals about their use of the Web," says David Post, associate professor of law at Georgetown University Law Center. "If they are not Americans—which they well might not be—you may be subject to the legal rules of other countries. Whether the Germans can enforce that is a complicated question, but if you have operations in Germany and your Web site is in Des Moines, you might think twice about what you can do."

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PREPARING
EDUCATION
FOR CHANGE

Degrees of Change

The new demands of higher education are pushing up the IT grading curve

BY MEGAN SANTOSUS

Imagine you are the CIO of a major research university. As such, you get to dabble with the coolest high-tech equipment around, including the control room you've built that's both the pulse of your institution and the envy of the local broadcast station. Displayed on each of the dozens of monitors are the "class" proceedings of numerous courses. To your right, screens show the work of students enrolled in a distance chemistry course who are using 3-D virtual reality applications to conduct experiments with dangerous

corrosive acids. To your left, business majors are reviewing a multimedia case study featuring video, text and audio clips of a beleaguered company's executives. And in the center of the room, several screens are monitoring the university's virtual learning environments set up in collaboration with far-flung schools and local businesses. Even though it's barely past dawn on a July morning in 2034, you can see that several hundred learners are "attending" various courses by communicating in two-way, real-time dialogue with their peers and teachers.

And that's what is going on just at the undergraduate level.

If you thought heading up an IS shop in a post-secondary institution meant having a cushy schedule and

THUMBNAIL

Industry: U.S. higher education

Primary Service: Education and research

Total Expenditures: Approximately \$173.3 billion in 1994

Number of Players: 605 public four-year institutions; 1,610 private four-year institutions; 1,036 public two-year institutions; 437 private two-year institutions

Total Enrollment: More than 14 million students



SOURCE: THE CHRONICLE OF HIGHER EDUCATION ALMANAC, SEPTEMBER, 1996





FORCES OF CHANGE

Customer Requirements:

Both students and constituents, such as businesses and government, are demanding that graduates of post-secondary institutions have marketable skills. In addition, changing demographics mean that more students are older than the 18-22 age group.

Impact: Nontraditional students want more flexible schedules and alternative curricula. Businesses are joining community colleges to develop skills-based programs.

Costs: In the past decade, the cost of higher education consistently has outpaced inflation.

Impact: Colleges and universities are under pressure to contain costs and justify tuition rates. Institutions are also looking for other ways to bring in revenues.

Growth: With enrollment up over the past 10 years and the need for more-skilled workers increasing, higher education is a growth industry.

Impact: More players are entering the higher education market, including for-profit companies and virtual universities.

Technology: Students and faculty are demanding desktop connectivity, access to the Internet and multimedia applications.

Impact: Universities must increase spending on technology infrastructures. Multimedia applications promise to change how professors teach and design curricula.



summers off, think again. In the future of higher education, IT—and the CIO—have a seat at the head of the class. While the mission of the nation's nearly 3,700 institutions of higher education will remain to educate students and conduct research, the way organizations deliver and carry out that mission is changing. In addition, the rapid changes in the societal role of higher education have made universities an environment that's extremely receptive to the helping hand of information technology.

Competitive Edge

While Ivy League and other wealthy institutions don't have to contend as much

with many of the problems plaguing state and community schools (such as dwindling tax dollars), private and public schools face some common challenges. "The three major problems that confront higher education today are quality, costs and access," says Robert C. Heterick Jr., president of Educom, a Washington-based higher education consortium. "Institutions that are trying to improve in those areas are invariably looking to information technology."

As schools use technology to solve these problems, technology itself becomes a competitive edge. With the advent of distance learning, for example, barriers such as geography and finite classroom space begin to dissolve. To accommodate remote learners (to say nothing of the 18- to 22-year-old resident students who want to browse through the library's holdings without leaving their dorm rooms), universities must build robust, point-to-point networks and develop strategic IT plans. Schools that don't keep up stand a good chance of losing students to competitors.

The business schools at Harvard University and the Massachusetts Institute of Technology, both in Cambridge, Mass., are spending millions on networks, wired classrooms and Web-based services as they wage a battle to attract the best students.

And at Boston College Law School, where a campaign is currently underway to replace all the old buildings at the Newton, Mass., campus with modern, wired facilities, technology is a major competitive weapon. "It's important that we keep up with the state of the art and know what's going on at other schools," says Joe Harrington, computing and communications specialist for the law school. The school boasts a brand-new library that's wired with 700 ports where students, faculty and staff access the Internet, look up research material and send e-mail. Over the next few years, says Harrington, the school will rebuild classrooms and faculty offices and wire them to facilitate fully electronic coursework.

Stanford University in Palo Alto, Calif.,

COMMON THREADS

IS executives in industries undergoing dramatic change should:

- Look for new** and efficient ways to deliver services to customers and constituents.
- Implement technology** that can move decision making as close to customers as possible.
- Find partners** who can collaborate on complicated and expensive technology solutions.



will spend \$61 million over the next four years to build a common Web-based infrastructure and other large systems that link administrative and academic computing, according to CIO Glen C. Mueller. "What's strategically important for us is attracting world-class faculty and students," Mueller says. "Having a backbone network and other technology services is a competitive advantage."

Developments in distance learning also open up a range of new educational products and services, says Brian P. Nedwek, associate provost of Saint Louis University in Missouri. For example, he sees the potential for Microsoft and Disney to create interesting and academically solid educational products. He also

predicts what he calls the "unbundling" of higher education; instead of attending one school for a degree, students could pursue individual courses or pieces of a degree at various institutions (see "A New Way to Learn," Page 86).

The issue of affordable tuition spurs competition as well. An August 1996 study conducted by the U.S. government's General Accounting Office (GAO) found that tuition at four-year public schools—where two-thirds of the na-

I.S. ACTIONS

Create a strategic plan for an information technology infrastructure that integrates both academic and administrative computing environments.

Establish links among students, faculty and other institutions in an effort to share their data and capitalize on their expertise.



Build an information architecture that supports new demands such as distance learning and flexible scheduling.

Explore new ways to deliver course content, facilitate research and enhance the learning process.

Implement client/server technology to replace or augment centralized mainframe-based systems.

"People are asking themselves, 'Is public education really cost-effective if it takes five years to get a degree?'"

—RICHARD KATZ

One Size Does Not Fit All

CIO roles in academia vary according to school budgets

The role of the CIO in higher education comes in all shapes and sizes. "There are three different types of higher education organizations, and each requires different skills from the CIO," says Peter Segall, a partner in Coopers & Lybrand LLP's higher education consulting group in Boston.

At large research institutions with overall budgets of more than \$200 million, Segall believes the title CIO is a misnomer. "You can't be a chief of anything at those organizations because they are feudal empires," he says. "Decision making is decentralized to the local level where each dean runs the show." Segall believes CIOs who provide intellectual leadership and guidance for making technology decisions are most appropriate for large universities. The CIO should manage perhaps 5 to 10 percent of the total infrastructure (such centralized systems as finance and accounting, for example), Segall says; the rest of the CIO's time should be spent managing enterprise resources such as site licenses, training and consulting. "The most valued role is that of a strategic technology officer who

can ensure that the infrastructure is in place and make sure technology issues are discussed by the board," Segall says.

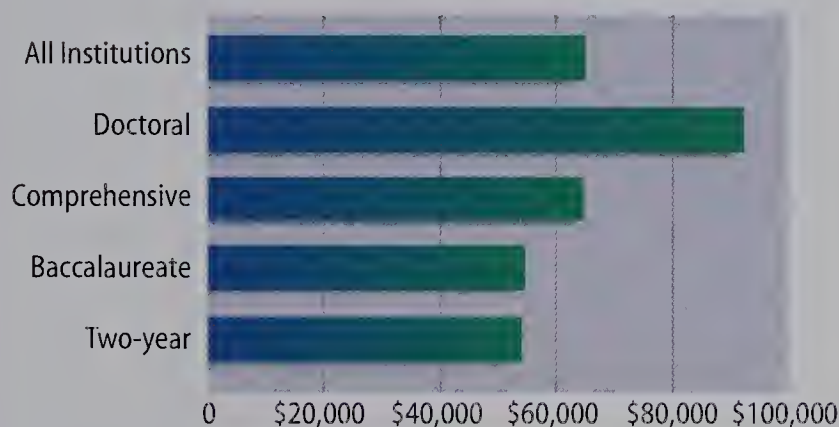
For universities with budgets ranging from \$25 million to \$200 million, CIOs often have more control over

financial and administrative systems.

However, CIOs should not have the final say on technology affecting the academic institution.

"Technology hasn't yet reached the point where we know its impact on teaching and research," Segall explains. "Because the nature of academic work is very personal, the ultimate decision to use technology must remain with the faculty."

Median Salaries of College and University CIOs, 1995-96



SOURCE: THE CHRONICLE OF HIGHER EDUCATION

A CIO can have the most direct influence on technology choices at a college with a budget under \$25 million. "Those CIOs have an easier time dictating technology decisions because there's more acceptance of centralized control, particularly when it comes to administrative computing," Segall says. At small colleges, CIOs can be the final arbiter for financial systems, desktop standards and the networking environment.

—M. Santosus

tion's 9 million undergraduates enroll—rose 234 percent between 1980 and 1995, while median household income during the same period increased only 82 percent. GAO attributes the rise to higher administrative expenses and a greater dependence on tuition as a revenue source.

While the price of college has risen, many customers feel quality has eroded. At many public universities, students often need five years or more to earn an undergraduate degree because they can't get slots in required courses. "People are asking themselves, 'Is public education really cost-effective if it takes five years to get a degree?'" says Richard N. Katz, vice

president of CAUSE, a nonprofit association in Boulder, Colo., that promotes the use of information resources in higher education. In response, says Katz, some universities are considering offering guar-

There will be providers who will come into our territory and offer the same services that we do."

—RON BLEED

antees that promise graduation within four years, provided of course that students do their part. "Parents and students are getting a lot more discriminating when it comes to selecting a university," he says.

A Changing Relationship

Universities are addressing those in-

creasing demands by treating students more like consumers whose business they care about capturing. Increasingly, schools are seeking to establish lifetime relationships with students. "The notion

that students are customers who have more than a four-year relationship with an institution is a new concept," says Jill Kidwell,

a partner at Coopers & Lybrand LLP's higher education consulting practice in Minneapolis.

At Wake Forest University in Winston-Salem, N.C., tuition covers an IBM ThinkPad complete with Lotus Notes, Microsoft Office, Netscape and Eudora. Each campus building is linked via Cable-

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tors use to transfer files, search the Web, access proprietary information such as transcripts, health records and financial aid data, and swap e-mail. While the infrastructure helps current students (who get updated machines their junior year), Network Manager Ron Rimmer sees the real payoff of the technology further down the road. "As students become alumni, we want to have contact with them," he says. "Once students leave here with a computer, we want to tie them back into the network." Wake Forest is dedicating a server to handle alumni e-mail accounts and Web pages to cement those ties even more.

While maintaining alumni relations makes sense from an endowment perspective, Wake Forest hopes to offer distance education as well. And the school

is not alone in its attitude. Societal trends such as downsizing and lifelong learning are influencing higher education's curricula, missions and goals. "People

cellor of information technologies.

"Traditional barriers of entry such as geography, physical facilities and accreditation are receding," Bleed says. "There

Not too far in the future, students will sit in the comfort of their own homes and "attend" business courses over the Web.

are going to have two or three different careers in their lives, and more vocations require [more] certification," says Gene Dippel, CIO at California State University in Fullerton. "Those changes are forcing universities to reexamine their roles in their communities."

The Maricopa Community Colleges in the Tempe, Ariz., area are looking at providing new services to the more than 160,000 adults who attend classes. For example, students can take more than a dozen courses over the Internet. Maricopa also is exploring options such as on-demand class scheduling and just-in-time training, says Ron Bleed, vice chan-

will be providers who will come into our territory and offer the same services that we do." Bleed predicts that choosing a college or university will resemble choosing a utility company: Students will shop around for the best, cheapest, fastest and most convenient programs without regard to geographic location.

Before schools go virtual in a big way, however, the Internet will need some revamping. That's why more than 80 schools have joined Educom for a \$500 million project called Internet II, which is designed to solve some of today's performance problems.

Not too far in the future, students will sit in the comfort of their own homes and "attend" business courses over the Web that feature audio, video and text formats and allow interaction with fellow students. That's not to say that the four-year residential college experience will disappear. But people will choose the programs that suit their schedules, interests and career goals, integrating formal learning with their jobs and lives.

HIGHER EDUCATION AT A GLANCE

PAST

Secure in the knowledge that a degree is a good investment in terms of leading to brighter economic prospects and better paying jobs for graduates, higher education institutions historically have felt little pressure to contain spiraling costs or align curricula to specific business needs. To earn a degree, students physically traveled to college and university campuses. Courses were taught by faculty or teaching assistants in a linear fashion, and degrees were granted upon completion of coursework during a set period of time.

Students and universities could rely on a steady stream of financial resources—such as government appropriations and grants—to cover tuition and expenses.



FUTURE

With the costs of education outpacing inflation and consuming huge portions of middle-class incomes, colleges and universities are being forced to become more efficient in an attempt to contain tuition costs. In addition, with increasing competition from nontraditional players such as online programs and for-profit companies, traditional institutions will develop innovative programs that are flexible and geared toward teaching marketable skills. No longer bound by geography or time thanks to distance learning and the Internet, students can pursue educational opportunities in ways that best fit their lifestyles. In many cases, a portfolio of courses with established competency levels will replace traditional programs that emphasize grades and degrees.



Internal Change

As the needs and demographic makeup of their customers change, schools are borrowing a page from private industry by reengineering their administrative processes as well. The goals are familiar: Institutions want to become more efficient by reducing functional handoffs and pushing decision-making out of the president's office. That trend is particularly prevalent at public universities as the government gets stingier with funds. "Many institutions are in the midst of administrative reengineering in an effort to consolidate technology infrastructures," says C&L's Kidwell. At the eight-campus Indiana University system, for example, a Web-based financial decision-support system helps individual deans make decisions that were once made centrally by administrators at the school's Bloomington headquarters. "Each cam-

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pus has dramatically different demographics that individual deans are most knowledgeable about," says Barry Walsh, IU's director of decision support and systems for financial organizations. The school's 2,000 business managers can

view 22,000 accounts and query the Sybase data warehouse from their desktops. The financial information requested can be returned directly into a familiar spreadsheet package or viewed with a browser. Indiana's schools now operate much like separate business units of a company, with individual deans responsible for their own budgets, Walsh says.

Other universities are integrating long-

segregated academic and administrative computing environments. A client/server-based local area network linked by a campuswide area network is the architecture of choice for most academic institutions. "Campuses that have been mainframe-based for many years are making the transition to client/server," says Thomas J. DeLoughry, a former senior editor for information technology at *The Chronicle of Higher Education* in Washington who now works for *Web Week* in New York. "Generally, institutions want graphical interfaces, Internet connectivity and much more decentralized computing models."

While a world of IT-enhanced higher education sounds ideal, schools still face several challenges. For one, IT can make life tougher for folks in the development office. When a good portion of students learns through distance courses, it will have a significant effect on fund-raising, predicts John DeGolyer, information systems director at the University of California, Los Angeles law school in Westwood. "Traditionally, schools raise money for buildings," he said. "If schools go virtual, can they raise money for IT?"

And once schools wire every room, can they afford to support legions of desktops? "If every workstation costs \$8,000 to \$13,000 to support each year, universities have nowhere near that kind of money available," says M. Stuart Lynn, associate vice president of information resources and communications at the University of California in Oakland.

Support is not the only IT-related financial issue. The salaries of talented IT pros in academia tend to lag behind their counterparts in business. While most IT shops have difficulty retaining skilled people, universities have it the worst. Of course, universities also can offer unique fringe benefits including free classes and tuition discounts for family members.

Challenges notwithstanding, the consensus seems to be that higher education is an exciting place to work right now for IT folks. Says Lynn, "While technology is not a solution to all our problems, its use creates opportunities for enriching teaching and learning." CIO

Associate Editor Megan Santosus can be reached at santosus@cio.com.

A New Way to Learn

The future of education is independent learning

Imagine a higher education future without classrooms, syllabi, semesters or grades. Students learn at their own pace only those subjects and skills for which they need to attain competency levels to land a job or promotion. Such a "hyperlearning" environment may come to pass with the advent of distance learning technology and new skills among teachers. "I see education moving to emphasize the notion of competencies rather than courses or degrees," says William H. Graves, interim CIO at the University of North Carolina at Chapel Hill. "I can see education moving more to a portfolio model in which students learn certified skills that they can acquire from numerous sources."

Peter J. Denning, the associate dean for computing and chairman of computer science at George Mason University in Fairfax, Va., envisions a future hyperlearning environment where students attend virtual classrooms. In the current mode of education, students and teachers follow a sequence of topics and courses that typically culminates in a grade at the end of the semester. "It's all very linear," explains Denning, "with a fixed path, a fixed amount of time, and a variable outcome in the form of a grade."

Hyperlearning promises to turn the status quo on its head. Think of a virtual learning space with individual stations that correspond to a skill or competency. The goal of students is to exit the space with certifiable skills that can be provided by any number of players. Students enter the space and can proceed to any station.

While teachers may suggest certain paths, students are free to select the

order and the pace of learning. "In that kind of environment, the tasks and time vary but the outcome—certification—is fixed," says Denning.

The hyperlearning model will be made possible by the Internet and other digital technologies. For that scenario to be viable, however, Denning believes there must be radical changes in curricula and teaching methods,

not to mention business practices. "Perhaps there will be educational brokers who can organize these kinds of environments," he says. As for teachers, they will have to get away from the hierarchical mode of lecturing in front of classrooms and become more like managers and coaches. "Skills such as team-building and advising will be critical in hyperlearning environments,"

says Denning. —M. Santosus



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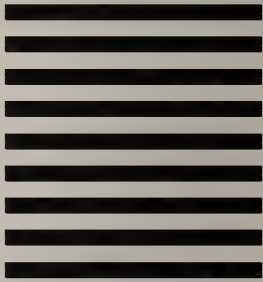
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THE Bigger PICTURE

Given the state of change in the business environment, it can be easy to lose sight of our real goals. A new book by information management guru Tom Davenport, *Information Ecology: Mastering the Information and Knowledge Environment*, raises important questions about what we want from information and provides a sane approach for how to get it.

BY TOM DAVENPORT

According to every pundit and computer company sales force, we are in the midst of a new "information age," one that will revolutionize how workers work, how companies compete, perhaps even how thinkers think. Few managers will admit to technophobia; with all the money spent on new equipment, no one wants to lag behind. But why is it that most of us, deep down, feel frustrated by information technology? Why do most workers—even CEOs—find it so hard to adjust to new systems and the information skills they require? Why isn't this revolution all it's cracked up to be?

Our fascination with technology has made us forget the key purpose of information: to inform people. All the computers in the world won't help if users aren't interested in the information generated. All the telecommunications bandwidth won't add a dime of value if employees don't share the information

From *Information Ecology: Mastering the Information and Knowledge Environment*, by Thomas H. Davenport, copyright 1997 by Oxford University Press. Published by arrangement with Oxford University Press, New York.



they have with others. Expert systems won't provide useful knowledge if the knowledge changes too fast to maintain—or if system designers can't even find experts willing to surrender what they know. Information and knowledge are quintessentially human creations, and we will never be good at managing them unless we give people a primary role.

The status quo approach to information management—invest in new technologies, period—just doesn't work. Instead, managers need a holistic perspective, one that can weather sudden business shifts and adapt to ever-changeable social realities. This new approach, which I call information ecology, emphasizes an organization's entire information environment. It addresses all of a firm's values and beliefs about information (culture); how people actually use information and what they do with it (behavior and work processes); the pitfalls that can interfere with information sharing (politics); and what information systems are already in place (yes, finally, technology).

Unfortunately, those who manage information technology in most companies—the programmers, chief information officers (or more appropriately, chief information technology officers), the systems analysts, the IT professionals—have little patience with the needs of “end users.” They throw technology at information problems; and whatever the problems—many of which result from ignoring how people and information relate to each other, not software glitches or idiot end users—this “machine-engineering” approach continues to dominate us all. Its adherents firmly believe that

- Information is easily stored on computers—as “data”;
- Modeling computer databases is the only way to master information complexity;
- Information must be common throughout an organization;
- Technology change will improve the information environment.

Each of these beliefs is based on a grain of truth. However, most managers—whether stubborn sys-

tems engineers or top executives who don't want to get involved with the IT “function”—have relied on the machine-engineering model far beyond its ability to add value. In some cases, implementing a

new application system or complicated database has actually set companies back rather than pushed them ahead.

Information ecology puts how people create, distribute, understand and use information at its center. Managers who take an ecological approach believe that

- Information is not easily stored on computers—and is not “data”;
- The more complex an information model, the less useful it will be;
- Information can take on many meanings in an organization;
- Technology is only one component of the information environment and often not the right way to create change.

Breaking down an organization's status quo is never easy. Information ecology calls for new management frameworks, incentives and attitudes toward organizational hierarchy, complexity and division of resources—for a start. Yet when managers at all levels fail to take a broader approach to information use, there are real consequences: from millions of dollars wasted on unnecessary technology to salespeople who don't understand how to use a customer database effectively. Ironically, as information becomes ever more important to us, we must learn to think beyond machines.

Information ecology places the

primary emphasis not on generation and distribution of reams of information but rather on the effective use of a relatively smaller amount. An information ecologist, like an architect or engineer, would still plan a company's information environment, but that planning would allow for evolution and interpretation. It would relax some of the central controls that never really worked anyway and make the people who need and use specific information responsible for it. In short, ecological approaches to information management are more modest, behavioral and practical than the grand designs of information architecture and machine engineering.

Why Technology Is Not Enough

THERE'S NO DOUBT THE AMOUNT OF information technology in organizations has increased and that it can be a powerful force for changing how we do our work. However, despite trillions of dollars, pounds, marks, francs and yen spent on IT for business purposes, technology appears unable—at least by itself—to supply us with the information we need to run and manage a busi-

ness. Despite 20 years of attempts to control information by creating an "architecture" of what is needed by whom and how they might receive it, the centralized engineering approaches employed have often neither informed nor improved our discussions about information needs.

Our information past has not only overemphasized technology, it has also devoted too much energy to information on computers. Information providers—specifically those in an information systems organization, which normally has far more employees than any other provider—focus on that narrow band of what can be contained in bits and by algorithms. That's because computerized information is easy to manipulate, distribute and store. But it's not particularly flexible or informative. The same attributes that make computer-based information easy to load into the computer, and easy to manage once there, make it less valuable to humans.

People prefer information that is timely and rich in contextual cues. We like information that involves sequence and causality (that is, a story), is presented with humor or given a unique interpretation and clearly has relevance for our work and lives. Perhaps this seems obvious. But what we get from computers is usually dated information with little or no context or clues to meaning, devoid of sequence or causality, presented in impoverished formats, in much greater volumes than we care to sift through.

While it is technically possible to represent quite complex aspects of reality in ones and zeros, usually much of the value is lost in the translation. Even if we could put on a computer the late-breaking news from the CFO's office that quarterly results will be down, we would also like to know whether the board has been told of the problem, if it's due to the recession in Europe or if our major competitor is doing any better. The computer rarely shows us the pained facial expression of the CFO as she relates the news or explains the obfuscatory wording of the memo that tells us something is really wrong.

Plenty of empirical research indicates that senior managers prefer information that doesn't reside on a computer. Various studies have demonstrated that computerized information doesn't provide the variety, currency and relevance to their problems that managers require. As a result, most executives rely on verbal information as their most important source.

Managers tend to get two-thirds of the information they use from human sources—most through face-to-face conversations, the rest from telephone conversations. The other third is structured information, most of which comes from documents about the external environment (market research reports, industry magazines, *The Wall Street Journal*).

Information managers would probably be better off if they declared a five- or 10-year moratorium on new technology and focused on information use itself.

But the world of information technology continues to advance, and some resources will have to be devoted to implementing new capabilities. Some of those capabilities will be useful in mastering the contemporary information environment—the ability, for example, to capture, store and distribute unstructured text, audio and video. At the very least, IT managers should spend their time implementing this particular set of tools, since they have the most potential to provide the kind of information we want.

Many types of information can be put on contemporary computers, from entries in the general ledger to videoconferences and expert logic. What I want to emphasize here is the distinction between focusing on simple "state data" and information that adds value for its human users. Information ecology, which prescribes a looser approach to structuring information, is much more appropriate for managing information of all kinds—not just the data that can scroll down a computer screen.

Ecological Attribute 1: Integration of Diverse Types of Information

AS BIOLOGICAL ECOLOGIES THRIVE ON species diversity, information ecologies thrive on information diversity. Indeed, many organizations have already begun integrating management of diverse types of information: computerized and noncomputerized; structured and unstructured; and text, audio and video. Such integration has been driven not only by new technologies but also by the need to better leverage nontraditional forms of information.

Unlike the other ecological attributes, information integration will happen to some degree without conscious action. At this point, computers increasingly capture, access and manipulate all types of information in some form (even if the form remains inadequate or has yet to add value). The organizational structures and processes used to manage computers are becoming de facto integrators.

Still, true information integration won't happen without major changes in management approaches and organizational structure. Existing information planning approaches, for example, deal with only one type of information. Just consider logistical processes in most warehouse facilities, where information planners address the quantities and volumes of items shipped but not equally vital information like customer complaints about late shipments. Even departments for the provision and management of information usually work with only one or two kinds. In most organizations, there's scarcely any contact between the information sys-

tems, library and competitive intelligence functions. Even fewer firms have information liaisons who can help find a useful nugget among multiple online sources, pie charts and databases. In fact, information providers that wish to meet their customers' needs shouldn't be directing people to any particular type of information; they should combine all the information media available.

More important, if noncomputer providers of information—be they middle managers, market analysts or executive assistants—want to direct the inevitable integration of information in their company, they need to begin explicitly addressing how to do so. They must meet with each other, perhaps for the first time; identify the key topics on which they should focus their energies; and understand how diverse information sources, formats and perspectives can be brought to bear on an issue for the good of the organization. They must resist the head-

long rush to grind all information into a format that is palatable to a computer. Given the diversity in any information ecology, it's up to non-IT-oriented providers to package information in forms that engage and spark the information consumer.

Ecological Attribute 2: Recognition of Evolutionary Change

SINCE IT'S IMPOSSIBLE TO UNDERSTAND OR predict fully how a company's information environment will evolve over time, information management must allow for change—even if it's not clear exactly what that change may be. That means the information systems in place also need to be flexible.

While I've sought a stable, predictable informa-

Book Review

Information Ecology: Mastering the Information And Knowledge Environment

By Thomas H. Davenport with
Laurence Prusak
Oxford University Press, \$29.95

In *Information Ecology: Mastering the Information and Knowledge Environment*, Tom Davenport brings a broad perspective and sense of sanity to the dramatic economic, social and political changes we have come to call the Digital Revolution. Davenport places human needs at the center of the information world, relocating technology, systems management and all the three-letter abbreviations to the edges. The writer is the first to admit that "information ecology" is an abstract metaphor. But it is an apt one, given the growing interconnectedness of organizations' information environments with the overall strategy and operations of the company and the external environment at large. Metaphor or not, Davenport keeps the reader's feet firmly in reality, citing actual situations, pitfalls, problems and solutions, and those wondrous flashes of creativity that befell the likes of IBM, Hallmark, Fidelity Investments, Toshiba and AT&T. The reader will find theory and practice judiciously

mixed. Conclusions are practical. Predictions are unqualified.

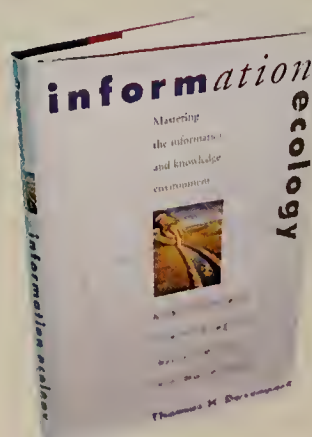
The book begins with a three-chapter section that both presents the theory and convincingly argues the need for a new way of thinking about information management.

The middle section is a detailed guide for putting the concept into practice. Strategy, politics, corporate culture, personnel, management processes and information architecture each take their turn under the microscope. Davenport draws on his and Prusak's considerable experience as consultants and researchers to present the case studies and occasional anonymous story of a business's stumble into folly.

The final section of the book looks most distantly outward, first taking up the overall information environment for the organization, then the organization's posture toward information and the outside world and

concluding with practical suggestions for the managers who make daily decisions in the real world, the place where pretty ideals collide with grimy reality. Davenport concludes: "We have tried machine-oriented alternatives for decades now without substantial success. It's time to look to ourselves for the information answers."

—Perry Glasser



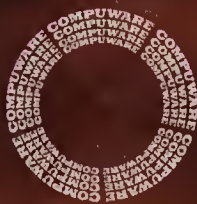
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tion environment for years, I have yet to find one. Once I thought I had in a privately held Northwest timber company. Timber is timber, and thus it shall ever be, or so I assumed. The need for wood being fairly constant, this privately held timber company appeared to be insulated from the usual market pressures. When this firm undertook an information engineering project, I thought, at last! Here's a company that will benefit from an entirely rational, machine-oriented approach. But as any information ecologist could have told me, nothing ever stays the same.

MOST IT managers know that traditional approaches to systems modeling and development can easily become obsolete before they're finished.

In the middle of the project, the U.S. government ruled that spotted owls in Western timberlands were an endangered species. If the firm didn't know where spotted owls lived in its forests, it couldn't cut timber. The information engineering effort was halted—after incurring great expense—and the firm began to wrestle with how to capture and use information on spotted owls. Much of the relevant information, of course, was in documents, maps and photographs. While computers can now contain such information, the company saw no immediate benefit in computerizing it all; out of necessity, it moved beyond machine-engineering approaches.

In fact, most IT managers do recognize that information environments are always changing. By now they know that traditional approaches to systems modeling and development can easily become obsolete before they're finished. In developing new computer-based systems, information technologists are realizing that they can neither anticipate the future for three to five years nor freeze changes during the development cycle. To address this evolution, some firms employ systems development approaches like iterative prototyping and so-called rapid application development.

But managers understand much less about how to deal with evolving information needs in general. Are there analogs to systems development approaches in noncomputer areas? What's the right compromise between building information structures that last and structures that can easily be modified? What approaches to managing continuous change from physical ecology can be borrowed and applied to the information world? While nobody knows the full answers to these questions—and they'll differ from business to business in any case—recognizing that evolution is an organizational fact of life is a necessary first step.

Ecological Attribute 3: Emphasis on Observation And Description

PERHAPS THE EARLIEST ECOLOGISTS WERE the biologists and naturalists like Darwin, who began by simply describing the world—from the Galapagos to the British countryside—in all its complexity. Only then could he and others understand why a species fit into its environment, or the dynamics of environmental change. Similarly, we must become more descriptive in our approaches to information management. It's the height of ignorance and hubris to believe we understand the information requirements of an organization after only days or weeks of interviews with a few people, yet this all-too-common assumption drives many information engineering projects.

While information engineers emphasize modeling the future, information ecologists take a more humble approach. As Henry Mintzberg [author of *The Rise and Fall of Strategic Planning*, New York Free Press, 1994] might say about strategic planning, if we can't anticipate the future, we shouldn't plan it in detail. Describing and understanding the existing information environment is a major undertaking in itself.

Indeed, the information environment in any large organization is highly complex. Describing who has what information, the various sources of information support, how information and knowledge are used in work processes, and the organization's intentions and objectives for information is an essential if sometimes overwhelming task. Given the multiplicity of information sources and uses and the close relationship between the information environment and the broader business environment of any organization, predicting the future is virtually impossible. For example, a company can't know who its competitors will be in the future or what information about them it will need; it makes much more sense to focus on describing the competitive information a company has today, along with the support staff for gathering new information when it becomes necessary.

Emphasizing description over future planning will take many different forms. In the area of information architecture, for instance, a new emphasis on description means developing maps of current information rather than models of the future information state. In the realm of information processes, it means creating a thorough understanding of existing processes before designing new ones. We need to start asking, "How is information gathered, shared and used today? Who are some particularly effective information users today, and what can

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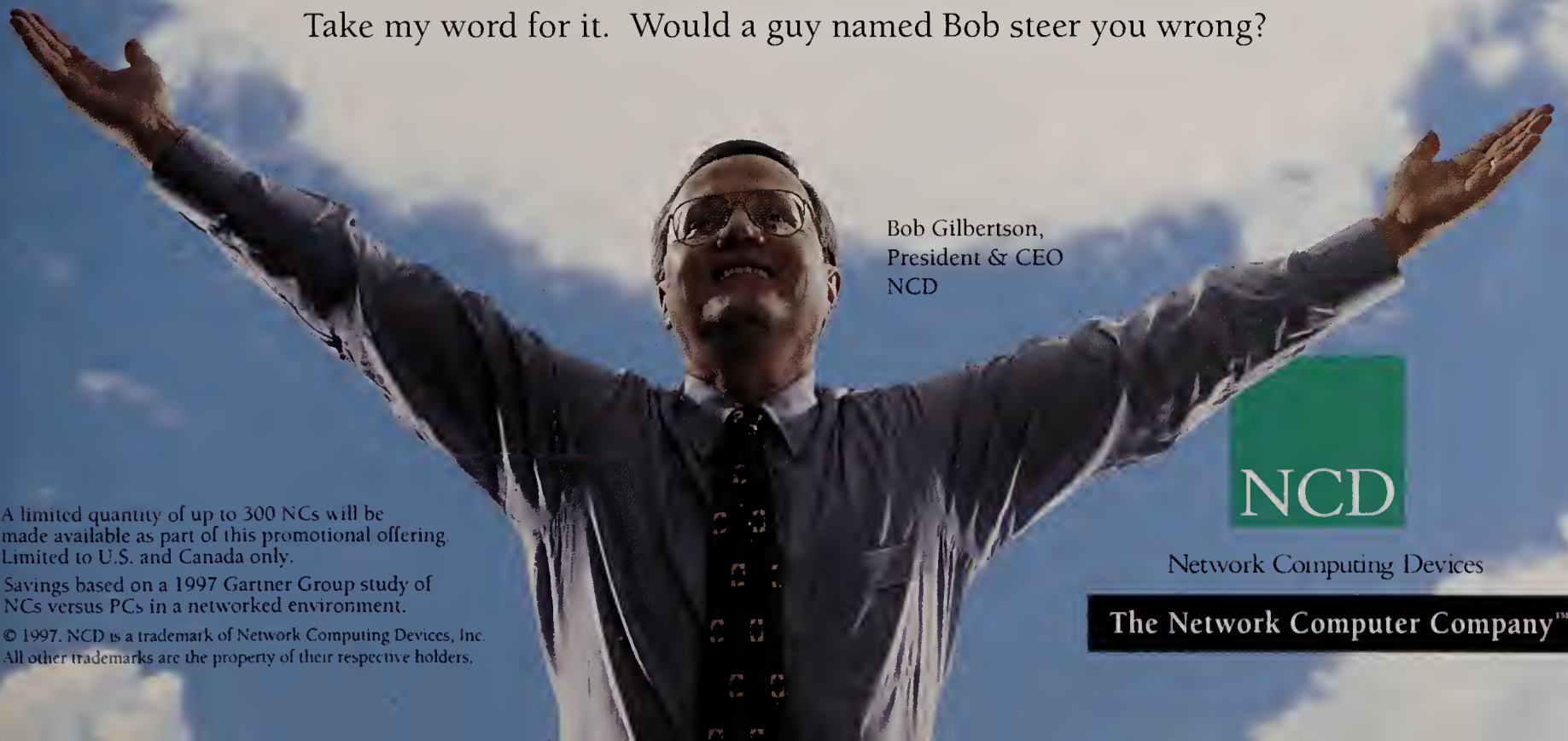
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we learn from them?" We know so little about information use in organizations that the first step is to observe the relevant "species"—information users—in their natural settings.

Ecological Attribute 4: Focus on People and Information Behavior

ANY ATTEMPT TO MANAGE ECOLOGY IN the physical world requires the participation of a broad range of inhabitants. Efforts to prevent water pollution, for example, rely just as much on persuading the residents of a city not to dump crankcase oil in the sewer as on building new filtration plants. When it comes to ecological information management, focusing on the people involved means not simply providing information—or even usefully observing what workers do—but also facilitating its effective use.

In the past, providers of information have focused almost exclusively on the production and distribution of information. What the recipients have done with it upon receiving it has been nobody's business. Therefore, we have little idea of how to help individual workers seek, share, structure and make sense of information. And we also know little about shaping or developing positive information cultures—those broad patterns of information attitudes and behaviors that recur throughout an organization.

But at gut level, most managers can see why the different approaches taken by the following companies matter. Xerox, like many initially successful companies, had an information culture that valued (at least implicitly) guesses and intuition. Then David Kearns became CEO in 1984. He slowly and painfully changed the culture to one that now emphasizes fact-based management, attempting to

IF a managerial action or initiative doesn't change information behavior, there's no point in bothering with it.

base decision making on hard evidence whenever possible. Of course, facts shouldn't elbow out informed intuition entirely, but Xerox did need to establish a healthier balance.

At General Motors, the information culture until recently emphasized financial information and the authority of the information presenter over the quality of the actual information. If a powerful product manager wanted to introduce a new car

model, market research was often conveniently ignored by the product manager and the executives who approved product decisions. But CEO Jack Smith succeeded in making the information culture more oriented toward operational and quality information. For instance, new information was presented at board meetings, and senior management meetings addressed new topics and measures.

In short, information behavior is a vast untapped dimension of information management. From where I stand, if a managerial action or initiative doesn't change information behavior, there's no point in bothering with it.

A Model for Information Ecology

A PHYSICAL ECOLOGY—SAY, THE Amazon rain forest—is not a single entity with only a few, unvariable components. Even a specific geographical area usually includes a number of microenvironments. In the overall ecology of a rain forest, for example, the environment of the treetops—which is exposed to the open sky and includes monkeys, butterflies, birds—differs from the shadowy world under the leaves—the snakes and sloths, other monkey species, butterflies, birds—and differs again from the soil underground, with its complement of worms, mold and other parasites. These environments overlap and affect one another, even if they seem very different. If somebody contaminated the rain forest's groundwater with selenium, for instance, all three environments would change—probably for the worse, although no one can fully predict such outcomes. It's possible that killing off a number of trees in one area might allow more space for tree-top dwellers in another.

In any information ecology there are also three environments. The information environment of a company is the main focus of this book. But this environment is still rooted in the broader organizational environment surrounding it; both of these, in turn, are affected by the external environment of the marketplace. In actual practice, these environments overlap and have fuzzy boundaries at best. That's why information initiatives can involve all three, whether managers are aware of the connections or not.

To date, there are no practically oriented approaches that encompass all components of an information ecology—that is, how an aggregate of individuals, in a particular organization, in a particular industry affected by broader market trends, works with, thinks about, focuses on and generally manages information. But to manage ecologically, we must first understand the overall landscape



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in which information is used. To this end, I propose a model for information ecology that indicates the many interconnected components of this approach.

The Information Environment The inside circle of this model is the core of an ecological management approach. It encompasses the six most critical components of information ecology—strategy, politics, behavior and culture, staff, processes and architecture. [Editor's note: *Information Ecology* devotes an entire chapter to each of these components.]

The Organizational Environment While a company's information environment will be the site of most management initiatives, it's always rooted in the broader organizational environment—including the overall business situation, existing technology investment and physical arrangement.

The External Environment Any company's information ecology is bound to be affected by external factors, many of which the company can't directly control. Governments create new regulations, customers' requirements evolve and competitors take unpredictable steps. A country's politics or cultural trends usually act on a given company rather than the other way around. In any information ecology, the external environment consists of information about three basics: general business markets, technology markets and—perhaps the most important type for our purposes—information markets.

The Information Ecology "Web" Creating change in an information ecology is clearly a complex, multifaceted undertaking. As in a natural ecosystem, a change in one environment will affect the others. Information ecologists ask questions like, "How does our information strategy affect our business strategy and vice versa? How do information politics reflect or help to shape broader organizational politics? How do all of these factors relate to overall business success?"

We know that information systems often don't meet the business objective for which they were intended, although firms have long tried to make information systems (if not information initiatives) align with business strategy. However, information ecology argues for a higher level of integration than that—an explicit acknowledgment that the many different elements form an interconnected web. Based on everything I've observed in companies, I believe true information changes are connected not only to strategy but also to organizational structure, culture, a firm's physical arrangement and all the other components of this model.

Here, we no longer overemphasize technology but place it in a balanced perspective. Certainly, the technology available in the broader marketplace, as well as the specific technologies that an organization chooses to implement, can affect what infor-

mation is available and how easy it is to access. In fact, I include technology in this human-centered model to show that technology and people are inextricably related. Certainly, some technologies are more human-oriented than others; but rather than simply assuming more technology yields a better information environment, thinking ecologically means accounting for how politics, strategy, behavior and other human factors all intervene in this relationship.

In a consumer products company, for example, an information strategy might focus on getting better information about customers—both retailers

WHEN *it comes to planning, ecological thinking calls for a certain humility.*

and consumers. Information process plans might address how consumer behavior is better understood through scanner data or frequent-buyer programs. Approaches to information behavior could focus on development of better analytical skills in order to draw conclusions from vast amounts of consumer transaction data. Information staff might include a "category manager" who analyzes sales of particular brands. Managers might also emphasize information about the external environment—competitors, consumer trends, the economy.

When it comes to planning, of course, ecological thinking calls for a certain humility. No manager will ever be able to anticipate all of the events that drive the nature and success of an information ecology. On a more day-to-day level, highly detailed plans tend to inhibit communications about information changes and directions. I have no doubt this model can help planners, but I suggest employing it modestly, with a grain of salt.

Indeed, no company that I've worked with fully employs an ecological approach. Information ecology remains a vision, a new way of seeing the world of information use—but I'm convinced it's an absolutely essential perspective. Even if information ecology has yet to be realized, some companies have begun grappling with their own information environments out of competitive necessity. From the way they balance, shift and revise the many complex connections, we can learn what works—and what doesn't. **CIO**

Thomas H. Davenport is a professor and director of the information management program at the University of Texas at Austin and a regular columnist for CIO. He can be reached at Tdav@notes.bus.utexas.edu.

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Panelists at
a recent CIO
Perspectives
conference
share their
experiences,
strategies and
mistakes in
dealing with...

FOUR I.S. CHANGE AGENTS TOOK THE stage at the CIO Perspectives conference "Leading the Charge in Turbulent Environments: IT as a Change Agent," held in San Diego in March. Moderated by CIO Editor in Chief Abbie Lundberg, the discussion touched on issues common to all instigators of corporate change.

Lundberg: *What was the motivation for change at each of your companies?*

Kepler: The Dow Chemical Co. is a large multinational company in the process of changing its focus to emphasize productivity and value growth. Our organization was based on geographic structure. In looking at our IS capabilities, we realized we should reorganize, and we entered into an [outsourcing] alliance with Andersen Consulting in which 150 IT people changed companies. We've taken most of the [geographically dispersed] IT resources and focused them in Michigan, Texas and Europe. That forced a lot of standardization in IT. We also went from a standard project methodology

THE PEOPLE SIDE OF CHANGE



Debra Robinson

Linda Wiersema

into total quality management activity, with standing teams focused on implementation and testing.

Wiersema: I joined LTV in November, but my primary change management experience came at Brunswick. We put in a new order processing system, and from 1994 to 1995, we replaced our manufacturing system. There were significant people challenges around that. I learned that it doesn't matter if people knew MRP [manufacturing resource planning] from before or not; it's a new system and a new way of working.

Newbold: The underlying fundamentals of Kaiser's business were eroding, while net income continued to rise. That made it difficult to build a sense of urgency around change. We had to improve significantly the service of the organization to internal and external customers and make decisions more quickly and effectively. Later we also had to work on cost management.

Robinson: Delaware North is a holding company for seven different lines of business. We needed to improve our collaborative efforts across business lines. The driver for change was the need for competitive advantage in new and changing marketplaces in which we operate food and retail concessions. Delaware North had entered new markets, including national parks like Yosemite

The Panelists

David E. Kepler, director of information systems, The Dow Chemical Co., Midland, Mich.

Philip N. Newbold, executive vice president and COO, Data Dimensions Inc., Bellevue, Wash.; former vice president and director of information technology services, Kaiser Permanente, Walnut Creek, Calif.

Debra C. Robinson, vice president of information technology, Delaware North Companies Inc., Buffalo, N.Y.

Linda Wiersema, general manager of information technology and CIO, LTV Steel Co. Inc., Cleveland; former director of IS at Brunswick Indoor Recreation Group, Muskegon, Mich.

Moderator: **Abbie Lundberg**, editor in chief, CIO

as well as the Kennedy Space Center. The company's original markets—sports arenas and airports—were also changing rapidly.

Lundberg: *Debra, why was your position, vice president of IT, designated to spearhead pivotal change?*

Robinson: The CEO felt he could use this position to leverage change, and he went looking for a misfit, someone who didn't fit in with the corporate culture. They spent a lot of time interviewing me and giving me tests like the Myers-Briggs personality test to make sure I didn't fit in.

Lundberg: *Large-sale change can be disruptive. How do you execute change without adversely affecting IT service levels?*

Robinson: We used a lot of outside resources.

Newbold: We focused on quality of service but recognized there would be some disabling effect from change. To make sure we got the service-level feedback we needed, we redefined development across business processes and made IT people accountable to people in the business units.

Wiersema: We had people assigned to keep the legacy systems running, and we had to put some good management around those people. They tended to feel that they weren't needed, because



David Kepler

Philip Newbold

PHOTOGRAPHY BY ROBERT BURROUGHS

they weren't going over to work on the new stuff.

Lundberg: *What were the effects of change on the people involved?*

Robinson: In IS, I experienced a 70 percent employee turnover, and I was in a rebuilding stage for 11 months. Some of the people in IS had been in maintenance mode for eight years, and they didn't like change. Depending on which cul-

ture you are dealing with, you get different results. The sports industry gave us the most resistance. It has a very strong culture, and baseball has strong traditions even in the way people sell peanuts and popcorn. Our airport business was more open to the change. Yosemite National Park was a closed community where no outsiders had come in for years, so there was lots of resistance there. We had to customize the change process for those different

How to Avoid Future Shock

Peter Drucker and Warren Bennis offer CIOs their predictions and advice

ACCORDING TO PETER F. DRUCKER, corporate America is headed for a major systems revision, and he's not talking about the year 2000 problem. Drucker, who appeared with University of Southern California's Warren Bennis at the March 1997 CIO Perspectives conference in San Diego, talked about the shortcomings of what he calls the two main information systems of an organization: the technical systems, or computers; and an older technology—the corporate accounting system.

The problem is one of quantity and content, he says. First, the systems measure the wrong things. Accounting usually focuses on costs, and IT generally translates to technology. Both need to be about something entirely different: information. Business information—that is, how to produce and market data about what customers want—should be the primary focus of any organization, says Drucker. Unfortunately, IT and accounting systems frequently produce data about the internal workings of an organization—organizational meta-



Peter F. Drucker

data, if you will. And, says Drucker, "inside the organization there are only costs. There are no results."

Moreover, Drucker predicts that the two systems soon will become one. "We don't yet have an organization built around information," he says. But, he adds, the systems are converging quickly: "The big challenge ahead is to make information the energy of an organization. We need to make one information system out of the two, and one information structure out of God knows how many."

To do so will require a better leader than the average Joe, and co-keynote speaker Warren Bennis outlined some of the attributes successful leaders share. Bennis, a distinguished professor of business administration at USC and the founding chairman of the university's Leadership Institute, says true leaders have the following competencies:

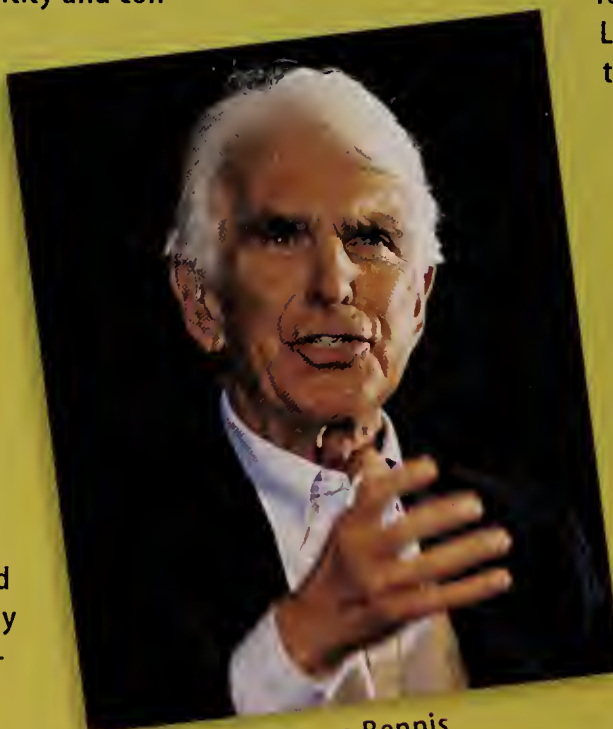
Purpose. A leader must have a total sense of conviction and be able to communicate that conviction to the rest of the team.

Trust. Leaders generate trust, according to Bennis, and leaders must know themselves before they seek to inspire others. "The one essential ingredient of trust is authenticity," he says.

Hope. Leaders, says Bennis, must "have a perception that what they try to achieve will have a positive outcome."

Action-orientation. Leaders have a bias toward doing rather than conceptualizing. Bennis quotes hockey great Wayne Gretzky: "You miss 100 percent of the shots you don't take."

—Carol Hildebrandt



Warren Bennis

APPLICATION FORM



The 1998 CIO Enterprise Value Awards

*Honoring Business Achievement Through The
Innovative Use of Information Technology*

APPLICATION DEADLINE: JULY 1, 1997

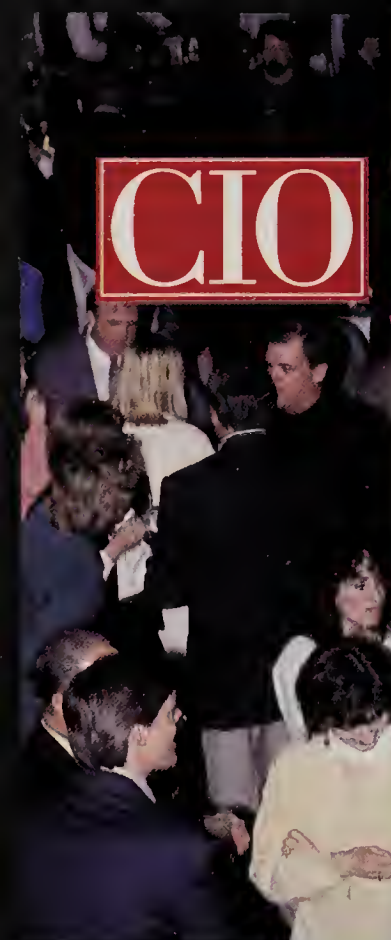
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The 1998 Enterprise Value AwardsSM

CRITERIA

A panel of independent judges will choose winners from among entrants who have submitted completed application forms to *CIO* by July 1, 1997.

Entries will be judged on the following criteria:

- The extent to which the system adds business value in furthering the organization's strategic or operational objectives
- The measurable financial return the system provides to the organization
- The extent to which IT was key in achieving the overall business solution—the “couldn't have done it without technology” factor
- The quality of collaboration between the business unit and IS organization that is achieved throughout the course of the project

Each finalist will be subject to an in-depth analysis of the nominated system (to be performed by *CIO* or its agents). That analysis, which may require a site visit, will be based on interviews with sponsoring executives and system users and will be designed to substantiate all claimed benefits. Notification of winners will occur in October 1997. *CIO* reserves the right to publish relevant cost and savings figures that establish the claimed ROI of the system; the willingness to divulge that information for publication is a condition of entry.

DEFINING VALUE

We invite applicants to consider the broadest possible spectrum of enterprise value. The following list of IT-enabled benefits is intended to help guide applicants' thinking:

- new, innovative and more productive ways of doing business
- revamped organizational structures or styles of performing the work of the enterprise
- the ability of the enterprise to enter a new market
- successful global operation or expansion
- transformation of the way the enterprise competes within its customary market or of the terms of competition within the market

- improvement of the enterprise's relationships with its external customers
- improvement of the enterprise's relationships with its own employees or among its functions (such as marketing, finance or human resources)
- the ability of the enterprise to compete more effectively by adding to the sum of its available knowledge assets
- leaner and more economical operations

ENTRY GUIDELINES

- The system must have been operational prior to July 1, 1995.
- Entrants must agree to be featured, along with their systems and organizations, in a *CIO* article.
- Entries must be complete.
- The application form may be reproduced.
- Multiple entries from one company will be considered, but each entry must be submitted separately.
- Entries must be made jointly by the IS executive *and* the business sponsor for whom the system delivers value.
- IT vendors, public relations and advertising companies, consultants and other third parties may *not* apply on behalf of another company. They are encouraged to forward this form to the “owner” of the system or to contact *CIO* Communications to recommend that an application form be sent to the client.
- All entries must be computer-generated or typed; no handwritten entries will be accepted.
- Entries must be on 8.5-by-11-inch paper, one side per sheet.
- When feasible, an additional copy of the entry should be sent on a 3.5-inch disk. Electronic entries must be limited to word-processing and spreadsheet packages that are compatible with Microsoft Word and Microsoft Excel on a Windows or Macintosh platform.
- To view a complete sample application, or for more information on the Enterprise Value Awards, please visit our Web site at <http://www.cio.com/forums/EVA.html>.

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Enterprise Value Awards

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POSITIONING IT AS A BUSINESS ASSET

Yet the CIO Enterprise Value Award goes beyond recognition. It is an opportunity to provide hard, tangible facts about business value and ROI from information technology to the business community at large. It is an opportunity to demonstrate how partnering between business and technology executives can lead to the attainment of strategic objectives. By communicating the payback, CIO hopes to encourage other businesses to invest wisely in IT to ensure their survival in a fiercely competitive global market.

DO YOU QUALIFY FOR AN ENTERPRISE VALUE AWARD?

Four criteria are essential.

1. A return of value to the enterprise
2. A measurable financial return attributable to the system
3. The pervasiveness of information technology — in other words, the strategic objective could not have been met without IT's contribution
4. A collaboration between an IT and business executive

IF YOUR INNOVATIVE SOLUTION meets the criteria, please complete this Enterprise Value Awards application form. The Feb. 1, 1998, issue of CIO will feature profiles of the winning organizations and the executives who have proved that their technology investments have had a positive and sustained impact on enterprise value.

IN FEBRUARY 1998, CIO will host a special awards ceremony honoring the Enterprise Value Award winners at the annual CIO Enterprise Value Retreat. For more information, please contact Lisa Kerber at (508) 935-4449.

CIO ENTERPRISE VALUE AWARDS TIMELINE

APPLICATION DUE: July 1, 1997

JUDGES SELECT WINNERS: October 1997

WINNERS ANNOUNCED: October 1997

AWARDS CEREMONY: February 1998
at the CIO Enterprise Value Retreat
Ritz-Carlton, Laguna Niguel, Calif.

*1996 winners from
United HealthCare Corp.*



1. COMPANY/BUSINESS UNIT

name of parent company

city, state where headquarters are located

publicly or privately held?

annual revenues

industry

name of business unit or organization

city, state where located

number of employees at business unit

URL

2. ENTRANTS

A.

name of entering IS executive / system sponsor

title

name of division, department or unit

address

city

state zip

telephone fax

e-mail

B.

name of entering business-unit executive / sponsor

title

name of division, department or unit

address

city

state zip

telephone fax

e-mail

3. SUPPORTERS

Please list four people who are willing to be interviewed with regard to the system, its development, its use and the value returned. At least one should be a member of the technology team that developed the system and should have played a significant role. At least one should be a primary user from the sponsoring business unit. The other two may be from either organization or represent suppliers, customers or others intimately familiar with the system.

A.

name

title

telephone fax

e-mail

reason for inclusion

B.

name

title

telephone fax

e-mail

reason for inclusion

C.

name

title

telephone fax

e-mail

reason for inclusion

D.

name

title

telephone fax

e-mail

reason for inclusion

DEADLINE: JULY 1, 1997

Mail to: Enterprise Value Awards • CIO Communications, Inc.
492 Old Connecticut Path • P.O. Box 9208 • Framingham, MA 01701-9208

4. THE NOMINATED ORGANIZATION

Please tell us about your organization (*company, business unit, agency*) in 500 words or less. Include information on:

- when the organization was founded
- mission statement
- major products and services
- markets served
- your organization's standing within its industry
- any other data you believe to be relevant in terms of general background

5. THE NOMINATED SYSTEM

Tell us about the nominated system and demonstrate its importance to your organization by completing the following sections. Please limit your material to one page.

System Description: In one sentence or less, describe the system or IT initiative you are nominating (e.g., order-entry or document-management system; switch to a client/server architecture; global network implementation).

Technical Profile: Briefly describe the technology of the nominated system. Please include the names of major vendors and products. (NOTE: The examples provided here are meant to be illustrative, not all-inclusive.)

- Architecture (e.g., *client/server, mainframe*)
- Hardware (e.g., *mainframe/parallel processor, mini-computer/server, PCs, handheld devices*)
- Software (e.g., *operating systems, database system, application software*)
- Software development tools (e.g., *CASE, 4GLs, GUI developers, object-oriented development tools*)
- Network/communications hardware, software and services (e.g., *modems, routers, e-mail packages, carriers and public networks*)

6. BUSINESS IMPACT

Describe the primary business objectives of and value delivered by the IT investment. Please limit this section to three pages.

Statement of Value: List the three most important contributions the system has made to the business (please refer to "Defining Value" section on the first page of the application form).

Business Value Description: In detail, describe how the system delivers the value identified above (please include supporting data). Also describe any added value delivered, whether intentionally sought or serendipitously encountered.

Scope and Impact: Identify the functions (e.g., customer service, manufacturing, planning) that were changed by the system, the nature of those changes and their impact on the business. Also indicate the system's uniqueness compared with solutions being deployed by other companies within your industry.

The Importance of IT: Identify the different components of the overall business change (e.g., business reengineering, downsizing, cycle times). Explain the importance of the IT component to the overall business change. Could the results have been achieved without IT?

Collaboration: Describe how the business unit and IS organization worked together throughout the project, from conceptualization to implementation. What were the specific tasks fulfilled by the business unit? The IS organization?

7. QUANTIFYING ROI

Provide a detailed, one-page summary of the nominated system's investment costs (including all upfront development expenses and annual maintenance charges). Also provide estimates of returns (including increased profits, reduced costs and indirect cost-avoidance). Estimates of costs and returns should be made per annum over a five-year period. This data is required to make it past the first round of judging. If your company is selected as a finalist, you will be required at that time to fill out a standardized table detailing specific costs and returns.

8. TRUTH OF INFORMATION/RELEASE

The following release must be signed by both nominating executives if the application is to be considered.

Unsigned releases will invalidate the entry.

I hereby state that the information provided is true and complete to the best of my knowledge and belief.

I authorize the release and use of, in connection with the Enterprise Value Awards program, any and all materials furnished by me or others at the company contacted for this judging. I understand that information submitted on this application or subsequently gathered during the evaluation and judging process may be used in articles or any other type of publicity relating to the Enterprise Value Awards program.

I also authorize the release and use of my name, my company's name and my likeness, including but not limited to any photographs and any recording of my voice or image that may be taken of me for CIO Magazine. I agree that no compensation shall be due me or my company for such usage.

I recognize that failure to meet these conditions or to provide sufficient material that can be published can cause the application to be rejected at any point in the process at the sole discretion of the sponsors.

1. _____
signature of nominating IS executive date
2. _____
signature of nominating business executive date

9. OTHER EDITORIAL OPPORTUNITIES

If you are not selected as an award recipient, are you willing to be contacted for inclusion in other articles in CIO Magazine?

☐ Yes ☐ No

How did you learn about the Enterprise Value Awards program?

- ☐ CIO Magazine ☐ Academician ☐ cio.com Web site
☐ Consultant ☐ IS staff member ☐ PR Agency
☐ Systems Integrator ☐ Other publications ☐ Other
☐ Vendor ☐ Advertising Agency (please identify)

CHECKLIST

Have you filled out...?

- ☐ Company/Business-Unit, Entrants and Supporters Information

Have you included on separate pages...?

- ☐ Nominated Organization
☐ Nominated System
☐ Business Impact
☐ Quantifying ROI

Have both entrants signed and dated...?

- ☐ Truth of Information/Release

Have you checked off...?

- ☐ Other Editorial Opportunities
☐ How you learned about the Enterprise Value Awards program?

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G E N U I N E R E P R I N T S F R O M



AT THE MARCH 1997 CIO Perspectives conference, "Leading the Charge in Turbulent Environments: IT as a Change Agent," held March 23-26 at the Sheraton San Diego Hotel and Marina, attendees heard from a diverse group of experts about the role of IT in driving business forward and the role of the CIO in leading and managing organizational change. Speakers included management guru Peter F. Drucker and leadership expert Warren Bennis as well as such CIOs from the workaday

world as John Dahms of the CIA, who managed to discuss the intelligence community's Internet strategies without revealing state secrets. In addition to the wide variety of lectures and sessions,

networking also was a top agenda item. Conference participants found plenty of time to exchange business cards and implementation stories in the Southern California sun.



groups; one type doesn't work for all. To do that, I traveled a lot to the front-line operations and asked, "How can IT help you in your business?"

Lundberg: *Some people find change management to be most difficult at the middle-management levels. How did you deal with that group?*

Newbold: The toughest thing for middle managers is that they have it coming at them from both directions. They have senior management pushing change from above, and they have all this pent-up emotion from the lower levels of the organization. Middle management also tends to be the targeted layer in change projects.

Kepler: We let senior management sell the concept, while middle management dealt with the change aspects of the transition. Their role was to understand employees' concerns through things like focus groups and bring those concerns back to senior management. Since the middle managers were not agents of change, they were better able to solicit that feedback. Later we eliminated the middle-management layer and created a flat organization.

Lundberg: *Some people say change is messy; you can't map it out. Others say unless you have a plan, forget about it. Should you plan for change?*

Newbold: I think realistically it ends up being a balance. Some things you have to plan; other things just happen. You need a plan for delivering your message about the change imperative—what the message is, who should deliver it, how often. A methodology helps you structure what you're going to do.

Lundberg: *What surprises did you have? What did you plan for that had a totally different outcome?*

Kepler: We built new work centers and experienced tremendous resistance in going from an office environment to an open-space environment. We expected the same resistance when we implemented it in Europe, but there wasn't any. We took longer to start the change process in Europe, and, because of that, [employees] were worried about whether they were really part of the team. So they were surprisingly willing to embrace the change when we got to them.

Newbold: When we posted all management jobs, both new ones and those already held by employees, we thought employees would be excited about applying, but the negative reaction was surprisingly overwhelming.

Lundberg: *David, at Dow you transferred staff to Andersen Consulting without having them interview for the positions. How did people feel about that?*

Kepler: We thought we were doing the right thing because we knew the qualifications of our people and didn't see the need to put them through the interview process at Andersen. In hindsight, that was a mistake because it made people think Andersen wasn't hiring them based on their merits but because Dow made them do it. Interviews would have let the employee and employer meet each other.

Lundberg: *Fear of change can cause paralysis. How do you work through people's fear and keep the organization moving forward? How do you maintain momentum and a sense of urgency?*

Newbold: You need to have new measures and goals—we had quality of service, new member growth, cost structure objectives—and put those out in clear terms. It's important to set some goals and keep achieving those and moving forward. It's difficult to sustain change if you can't show results.

Wiersema: We kept a sense of urgency around what change does for the business and made sure people knew every week what it would cost us in lost benefits if we didn't implement.

Kepler: Milestones put pressure on leadership. But for the rest of the organization, the real focus should be on quality measurements linked to business results so that people understand why they are doing things.

Lundberg: *Is there a balance between going too fast and maintaining momentum?*

Robinson: You have to be adaptable and flexible. If you take only a collaborative approach, the change will take three to five years, which is too long given the competitive urgency. But then the organizational psychologists we hired will say we're going too fast; people can't cope with that rate of change. I've learned to have some patience, slow down and develop a strong relationship with my subordinates to understand the impact this is having on people.

Lundberg: *How do you deal with problem people?*

Wiersema: People will resist change even if they see it as positive. We talked to them and said this

is normal, and that they should hang in there. Every other week, we'd get together to identify issues and decide how to solve them. A SWAT team was available to work on particular cases. Some people are downright negative, and there's not much you can do with them.

Lundberg: *What are the personal characteristics of a good change agent?*

Robinson: Wear a good suit of armor. You'll have arrows and missiles coming at you. It can be a very lonely position, but you can build supportive relationships with people in the business units. Also, communication has to be very open, and you need to accept what subordinates say to you. Really the most important feedback I'm getting right now is from subordinates.

**"I'VE LEARNED TO HAVE
SOME PATIENCE, SLOW
DOWN AND DEVELOP A
STRONG RELATIONSHIP
WITH MY SUBORDINATES."**

—Debra Robinson

Newbold: The ability to communicate is critical. When you're doing this all the time, your own thoughts are advancing constantly, and it's easy to assume others are at the same place you are in your thinking. I had a notion that if it's clear to me, it's clear to somebody else, but that isn't the case.

Lundberg: *If you had the opportunity to go back and do something differently, what would it be?*

Wiersema: I would initiate the change project by educating my sponsors better and helping them know what to expect. We did that after we got into the project and lost some momentum because of it.

Kepler: I underestimated the amount of work it would take in the leadership area, and we stretched people out in hours beyond what was reasonable. So I would put more folks on implementation if I could do it over again. **CIO**

Emerging Technology

THE STATE OF THE ART,
NEW PRODUCTS
AND STAYING AHEAD
OF THE CURVE

Edited by Elaine M. Cummings

Enter the Extranet

What can organizations gain from including outsiders in their intranets?

BY CURTIS F. FRANKLIN JR.

MANAGERS AT NATIONAL SEMICONDUCTOR Corp. are looking at marketing rollouts in a new way. A set of applications built on National Semiconductor's external Web site produces instant feedback on the progress of a new product, monitoring how the market responds to changes in pricing, positioning and information. "The combination of sales-force automation and an intranet tied to our external Web site allows us to gather information on everything about a customer surfing the Web site—where they are looking on the site, which products they sample, what processes produce requests for technical support or what parts they are buying," says Phil Gibson, director of interactive marketing at the Santa Clara, Calif., manufacturer. He says the set of applications promises to change the way the company introduces new products. "We can move data to one point, create a visual display of the data and put it on any marketing manager's desk," he explains. "When you modify the display, you see the effects ripple out. We'll give marketing managers real-time feedback so they can watch a product rollout ripple through the market. And we'll put it on the desktops—that's shattering in terms of the decision structure of the company." Gibson is blunt about the importance of the intranet and Internet to the applications: "Without all the nets, you just can't do that."

By now, the intranet is a familiar concept: an internal communications system that uses technology developed for the Internet. Often beginning with electronic mail, organizations eventually add scheduling and collaboration applications to create an organization that extends beyond the constraints of buildings and walls—an organization built on communications as much as material production. When the move outward in-



cludes customers, suppliers and trusted partners, the resulting communications structure is described by a new buzzword: the extranet.

While not every company has extranet plans that mirror those of National Semiconductor, most look for faster communications between trading partners, the ability to spread information throughout the organization and closer ties with customers, suppliers and partners.

What do organizations get from extranets? Quick communication with customers and partners is an advantage in the market. "Getting input from key customers on product features before introduction is important," says Richard Rebh, vice president of marketing for WebFlow Corp., an enterprise software applications firm also in Santa Clara.

National Semiconductor's Gibson also extols the benefits of fast communication. "[Extranets] make the company more effective," he says, "and the person who creates information is instantly available to the person who's using the information. The feedback loop hits

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real-time." That real-time cycle of response to new products, which gives engineers direct access to customer ideas for improving products, is an important ingredient in a strategy to shorten product cycles dramatically.

"Extranets make the company more effective because the person who creates information is instantly available to the person who's using the information. The feedback loop hits real-time."

—Phil Gibson

Having engineers and customers talk to each other may speed product development, but it also fundamentally changes the way information moves through an organization. Sharing information between such departments as marketing and engineering will make corporate data ubiquitous, providing information to individuals who formerly were denied access because they lacked a "need to know."

Giving information free reign across the company—or as free a reign as reasonable security concerns will allow—follows what Gibson calls the "Three Tenets of Intranets":

- **Without information silos**, information is stored not in discrete data repositories but across the expanse of the network and its users;
- **Without mailboxes**, the sender and receiver of information are as close as possible to one another, with neither electronic nor human filters;
- **Without cycle time**, individuals can act on information as soon as it's available, which is a good thing.

Together, these tenets create a powerful argument for the extranet as a tool for making the enterprise faster, more

Pipe Dreams

xDSL aims to squeeze more life out of tired copper wiring

IN AN AGE OF UNINHIBITED WEB surfing, porky multimedia data streams and other forms of ravenous bandwidth consumption, the hot new network medium is...copper. But wait, you say, copper wiring is older than taxation or gum disease. What's new about copper? The answer is xDSL.

xDSL isn't a contorted acronym for "dyslexia;" it stands for Digital Subscriber Line, with "x" marking the spot for a variety of possible prefixes. xDSL technology uses traditional copper wiring to handle higher-than-traditional data rates. It was originally developed for consumer uses such as interactive television or home Internet access, but it is gaining some respect in the corporate world as well. Industry analysts at Dataquest Inc. in San Jose, Calif., foretell a global DSL market worth \$2.5 billion by the turn of the century.

DSL proponents say the high data rates cost relatively little since using the technology doesn't require laying fancy new wires, according to Lawrence D. Gasman, president of Communications Industry Researchers Inc., in Charlottesville, Va. For example, asymmetric DSL (ADSL) claims transmission speeds in the vicinity of 9Mbps. However, beware of several yellow flags. DSL signals don't travel very far before fading and may require regularly spaced repeaters to boost signal strength.

Also, as the "asymmetric" implies, the 9Mbps rate applies only to data moving downstream, or off the network; the upstream rate from the client PC back to the network is significantly lower. And the

BANDWIDTH

interface to the PC itself can hamper the actual operating speed. "The 9Mbps tends to be 3Mbps in practice, depending on who you ask," Gasman says, "which is still quite good."

Other flavors of DSL promise even higher data rates or, in the case of symmetric DSL (SDSL), equal transmission speeds going up or downstream. Gasman says there are long-term uncertainties about the scalability of xDSL. At the moment, though, it's a viable option for small businesses and for getting remote access from branch locations. On the hardware side, Ascend Communications Inc. in Alameda, Calif., and PairGain Technologies Inc. in Tustin, Calif., are key xDSL providers; telephone companies including US West Inc. have started to announce commercial availability of DSL services.

"The telephone companies like DSL because they can use their existing infrastructure," Gasman says. "The real question is whether it can make its mark commercially before it gets clobbered by fiber."

—Derek Slater



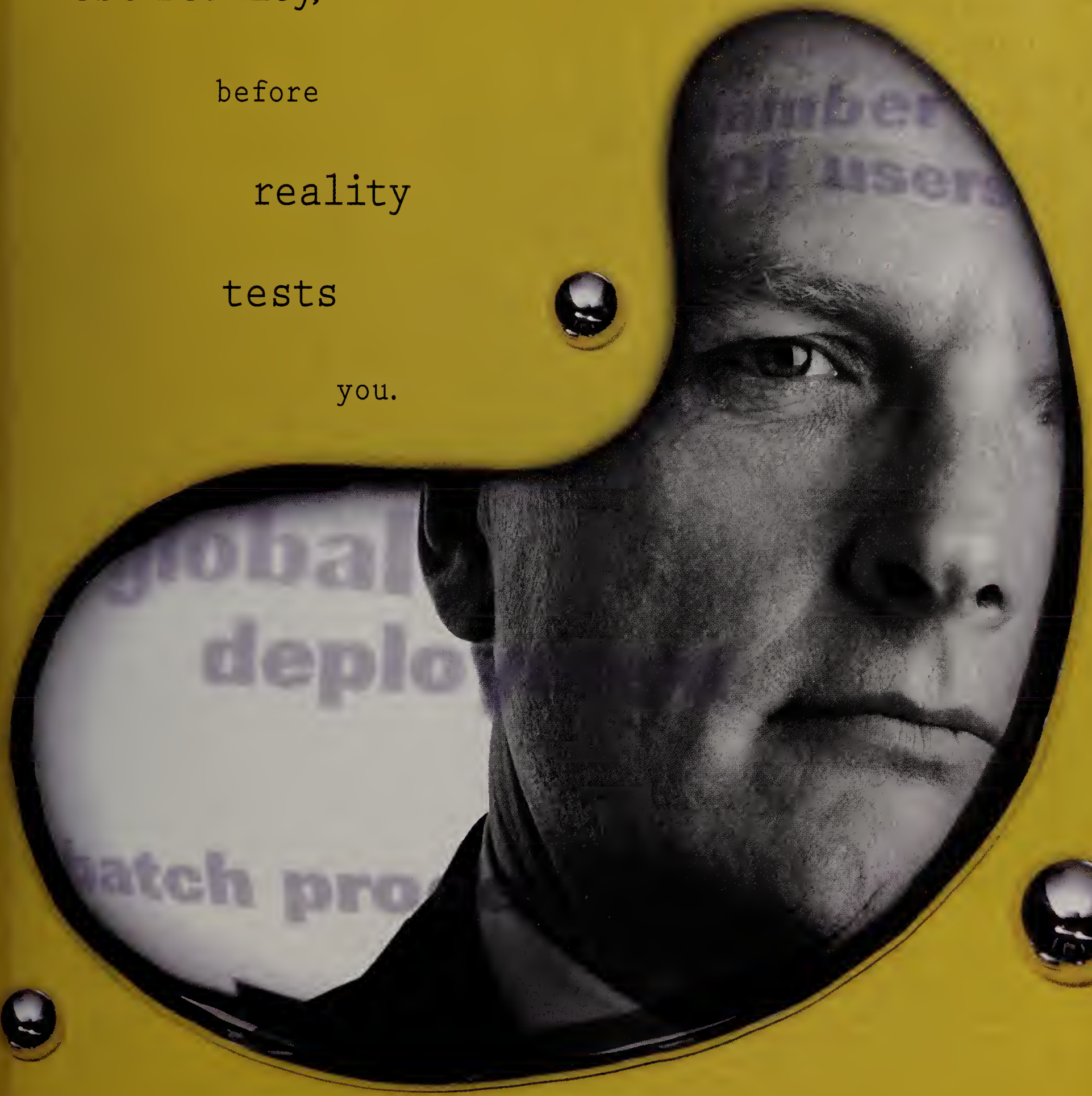
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responsive and more expansive.

So what are the major technologies involved? How are the high-speed promises of the extranet to be realized? The extranet rests on four technologies: the Web, the Internet, groupware applications and firewalls. It's possible that intranets and extranets would have developed without any one of the four, but highly unlikely.

The Web's major contribution to extranets is freedom from specific platforms. "If you have a client/server app for vendors, deploying that with traditional client/server isn't practical from an installation or support perspective," says Mark Templeton, vice president of marketing at Citrix Systems Inc., in Boca Raton, Fla. He points out that a significant limitation of the traditional client/server development approach is the requirement that each workstation execute the same software. Developing applications with a Web-based interface solves the software development and support problem, but not without cost. Companies may have to retrofit applications for the Web environment, leading to multiple versions of a supposedly standard application.

The Internet is the conceptual incubator of both intranets and extranets, and universal connectivity has liberated corporate communications practices. But the success of the Internet has carried a price. Robin Palmer, partner in charge of electronic commerce for KPMG Consulting in Palo Alto, Calif., has seen companies run into scalability issues directly related to that rapid growth. "There are issues on the Internet from the manageability standpoint," he says. "The tools we have to manage the Web are fairly immature." He explains that the tools used to manage an intranet generally make unrealistic assumptions about the nature of the systems on the intranet, causing certain types of hardware and software to remain invisible to the manager's screen. He also sees a lack of powerful directory services on intranets. "You'll find a lot of the good solutions for management have a proprietary structure for directories and even for digital signatures," he says.

Access and management may mean little to a corporate executive. For most companies that are installing extranets, protection against unwanted intrusion is made up of a products centered on a firewall, which is a device that examines incoming or outgoing data to stop any unauthorized transmission of or access to information. There

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It's About Time

MAXWELL SMART HAD ONE. The hero of Mission Impossible had one. Even Bill Gates has one: a personal information manager designed to look like a wristwatch. The **Timex Data Link Watch**, the product of a collaboration between Microsoft Corp. and Timex Corp., not only shows you how much time you have but also helps you use it wisely.

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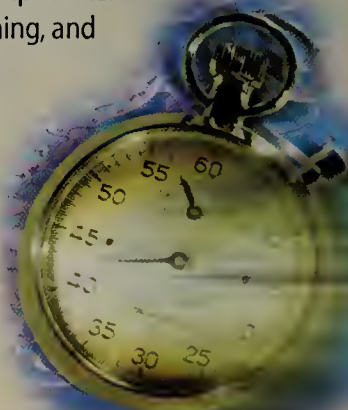
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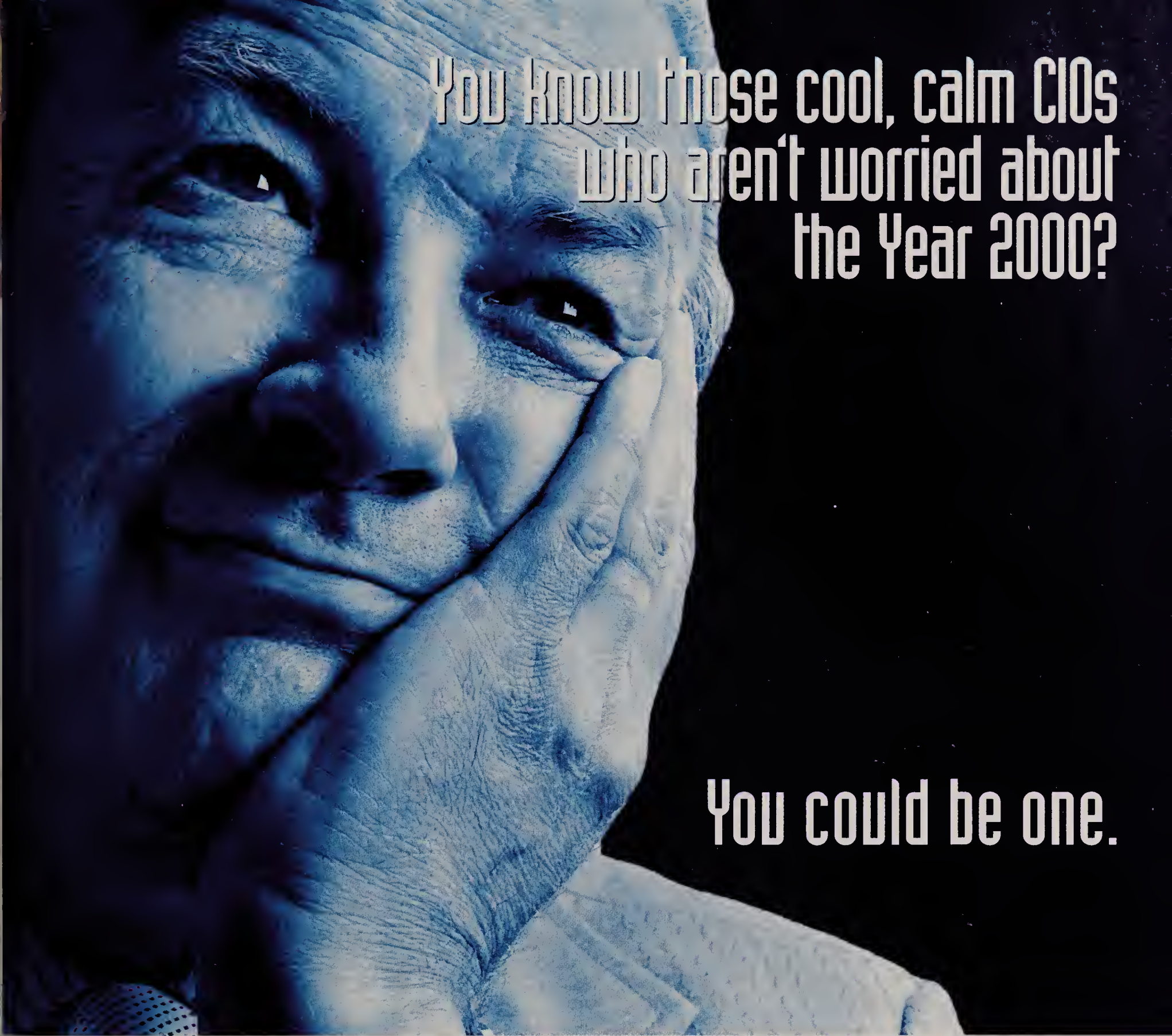
SUPERFASST, A NEW ACCELERATION utility from Seattle's Acceleration Software International Corp., is designed to boost your computer's performance by up to 496 percent. Clint Ballard, Acceleration's co-founder and CEO, says that high-end computers typically have plenty of CPU power. "Most of the time you spend waiting for your computer, you're waiting for the hard drive" he says. "SuperFasst removes the hard drive traffic jam."

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The company also says the accelerator can cut the load and launch time for software applications by up to 75 percent and allows quick switching between various applications. The product saves 10 to 15 seconds per launch; if you launch 50 programs a day, those seconds could add up to an extra week of productivity each year.

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are two principal types of firewalls in use, according to Alison Seaman, director of marketing at 3Com Corp. in Santa Clara, Calif. "Both packet-level and application-level firewalls can be set up," she says. "Packet-level firewalls are good enough for most situations because they tend to be thor-

ough, but they can also be slow and inexact. But when you're connecting to another intranet an application-level firewall is needed because the other company's applications might make legitimate requests of the network that are different from those an independent user might make."

Most IS directors protect themselves against "prank" intrusions, but extranet experts say that disgruntled employees or businesses lacking ethics may pose even more significant threats.

ough, but they can also be slow and inexact. But when you're connecting to another intranet an application-level firewall is needed because the other company's applications might make legitimate requests of the network that are different from those an independent user might make."

What, Execs Worry?

Many issues surround extranets, and executives should be aware of a few of the major ones. The first, not surprisingly, is security. Most IS directors protect themselves against "prank" intrusions, but extranet experts say that disgruntled employees or businesses lacking ethics may pose even more significant threats. WebFlow's Rebh suggests a multilevel approach to protect against the outside attacks that can infiltrate any casual protection.

"Our security is a function of four things," says Rebh. "The various servers you could get to from our Web server can be protected by name. But even if you could find the server, it's password protected. If you managed to hack your way in, you could see only what your hacked account would let you see. And finally, if you could get past that, we could use RSA or other encryption to hide the information inside a safe stream," he adds.

Another significant issue affects those whose lives and livelihoods may be affected by a new way of working. Gibson is a proponent of extranet technology, but he doesn't kid himself about the obstacles. "I do believe there are a lot of barriers to adopting [extranets]," he says. "It's really driven by your level of power. People controlled information silos in the past, and

you're talking about eliminating those, eliminating the power base for some people, and you can hit a lot of resistance. You have to make allowances for the fact that it's very threatening to some people."

Rebh says legal issues are also a concern. "You're now doing through a system what

was previously done face to face, and things that were not written down before may now be written and stored," he says. "As a result, you may be able to capture information that was never captured before. However, you may discover legal implications if subpoenas are issued. There may have to be guidelines on purging materials."

Finally, even when everyone in an organization supports the initiative to develop an extranet, the magnitude of the change should not be underestimated. Citrix Systems' Templeton says that it can be tempting to focus on the wrong measures of success when an extranet is created. "The natural tendency for management is to be interested in this automation for more transactions," he says. "If you don't handle the change correctly, your vendor or customer 'touch' declines, and you lose something." He asks a question posed since automation first entered the sales and marketing arenas: "How much touch can you afford to lose without losing the crucial interactions? If you drive transactions two times their previous rate but lose the contact with the customer, is it a loss you can afford?"

Templeton says he places the creation of an extranet in the same category of large-scale organizational change that includes reengineering. "Any time you take the intranet outside the company, it's akin to a reengineering project," he says. "There have been enormous cultural problems and resistance to these because of the level of change." **CIO**

Curtis F. Franklin Jr. is a freelance writer and director of Client/Server Labs in Atlanta. He can be reached at cfranklin@cslinc.com.

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Editorial, Advertising and Business Offices: 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208, (508) 872-0080. **Postal Information:** CIO (ISSN 0894-9301) is published semimonthly; monthly in July and August; and as a combined issue December 15/January 1 by CIO Communications Inc., 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208. Periodicals postage paid at Framingham, MA, and at additional mailing offices. **Reprints:** Copyright 1997 by CIO Communications Inc. All rights reserved. Reproduction of material appearing in CIO is forbidden without written permission. Send all reprint requests to Permissions Department, CIO, 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208. **Photocopy Rights:** Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CIO for users through the Copyright Clearance Center (CCC), provided that the base fee of \$3.00 per copy of the article, plus \$.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, Massachusetts 01970. Please specify: ISSN 0894-9301. Permission to photocopy does not extend to contributed articles followed by this symbol: †. **Subscriptions:** Address inquiries to CIO, 492 Old Connecticut Path, P.O. Box 9208, Framingham, Massachusetts 01701-9208; 800 788-4605. CIO is free to qualified information executives. To all others the one-year basic rate is \$98 for U.S. and Canada, \$110 to foreign countries (payable in U.S. funds only). The single copy price is \$8. Please allow 4 to 6 weeks for new subscriptions to begin. **Change of Address:** Please fax a copy of current subscription label along with new address to (508) 879-7899. Allow 4 to 6 weeks for change to take effect. **Postmaster:** Send change of address to CIO, P.O. Box 489, Northbrook, Illinois 60065-9816.



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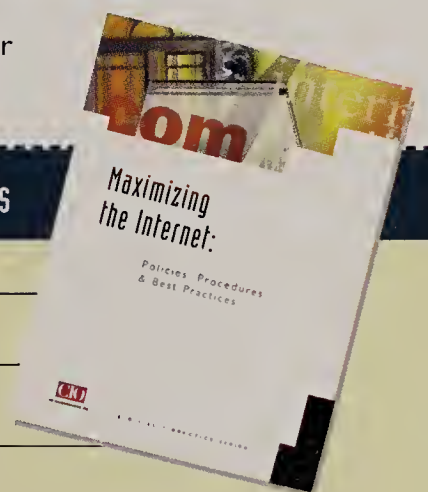
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ShopTalk

Rosenbluth's Dean Sivley on Marrying the Marketing and IS Functions

CIO: If you believe the Dilbert cartoons, marketing and technical people are natural enemies. What do you think?

The two organizations will definitely experience conflict because their goals are not aligned. Marketing people are clearly driven by the customer. They want to provide a certain service or product as quickly and as cheaply as possible. Technologists have to deal with the reality of what can and can't be done in a particular period of time.

What was behind the idea to combine the functions under your leadership?

We had two problems: We were not getting products out fast enough, and we felt the marketing side was not necessarily in tune with what was possible for us to do. So [CEO] Hal Rosenbluth and the other officers came up with the idea to combine the functions. That way, the two groups could communicate better, and only one person would decide the trade-offs between what goes into a product release and how soon we could get it out. They also felt I'd be better positioned to figure out which outside technology companies to partner with to fulfill our marketing needs.



Spotlight On:

Dean Sivley, vice president of marketing and CIO, Rosenbluth International Inc., Philadelphia

► **Line of Business** Corporate and consumer travel management

Bio Joined Rosenbluth in September 1995 as CIO; added marketing function to his responsibilities in 1996; previously was vice president of MIS at Duracell Corp.

► **Day to Day** In information systems, oversees telecommunications, network services, systems development and strategic planning; in marketing, develops technology-based products for corporate market and helps define and target customer segments, promotions and products for consumer market

► **Challenges** In marketing, avoiding disintermediation in the travel market by providing unique value to corporate clients; in IS, improving speed and reliability of new product releases

What are some examples of that strategy paying off?

On the corporate side, we decided that instead of taking more than a year to deliver our own customer expense management system, we would find a company we could work with and license its technology. We're selling a product from Captura [Software Inc.] that saved us a full year in time to market.

On the consumer side, we made an agreement to put a link to our Web site on AT&T's WorldNet site. The challenge was to figure out technically how to track not only the people it brought to our site but the success rate—when they actually booked something. Figuring that out and reaching a payment agreement [with AT&T Corp.] is an example where the IT and marketing skills were really effective together.

That example makes it sound like a logical pairing, but is marrying IS and marketing realistic for most companies?

In a product company, maybe not as much, but in service industries, where your whole service will be differentiated or complemented by technology, it makes perfect sense. I think it will become much more common, especially at smaller service companies. [Rosenbluth is a \$3 billion company with 4,000 employees, including 80 in IS and 40 in marketing.]

The ability to do so is more dependent upon having an individual with the right skill sets. It would be difficult for a lot of technologists to start thinking about marketing. You really have to have that grounding in marketing to understand the four P's—product, price, placement and promotion—with the complement of a strong technology background.

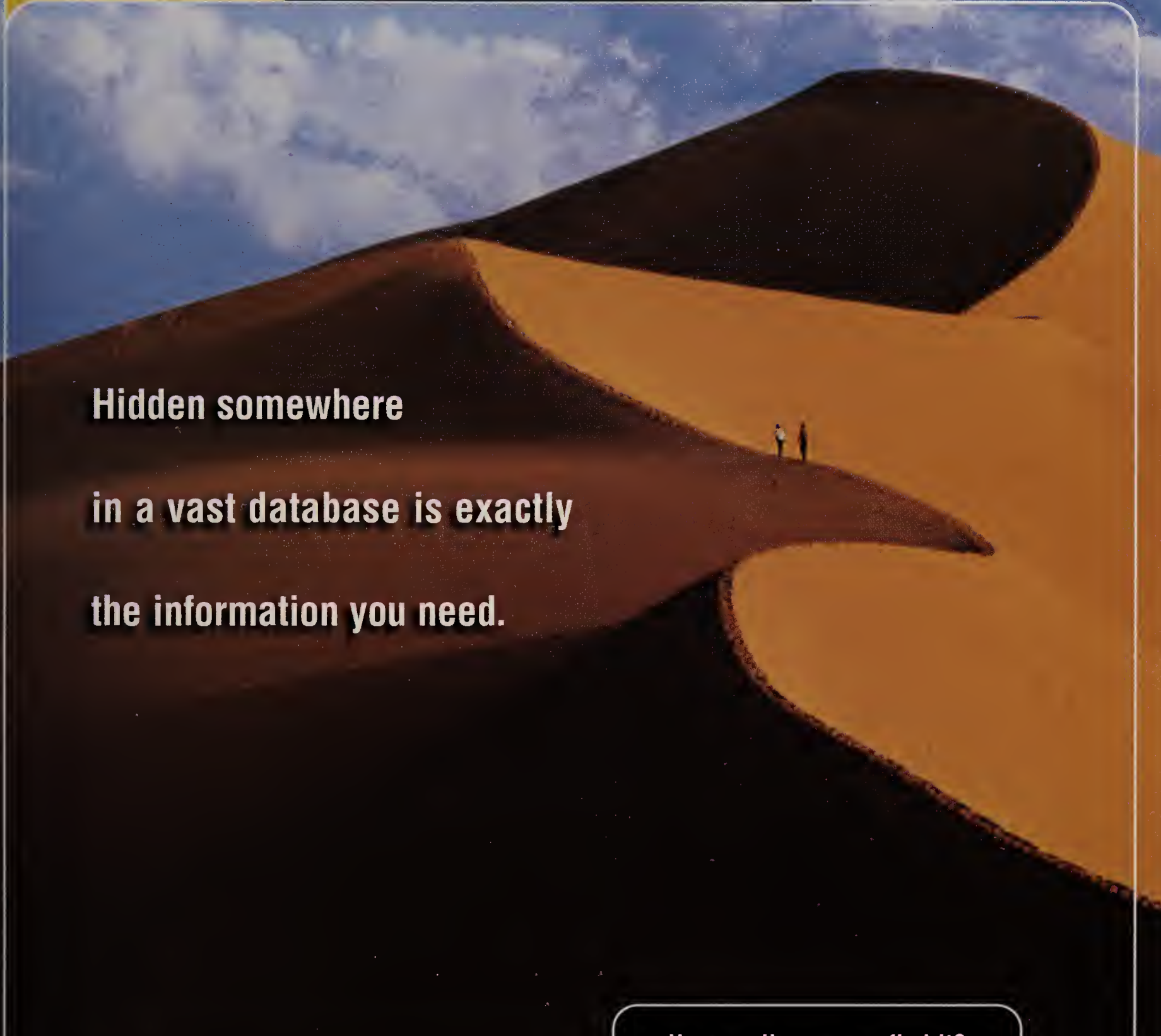
What management and personal challenges have you faced running both groups?

One thing I found out from internal satisfaction surveys was that I was spending a lot of time on the marketing side but probably not enough with the IT group. I now try to make sure that at least every two weeks I meet with every one of my direct IT reports individually. I've had to spend a few more hours at the office, but I think it's time well spent.

— Richard Pastore

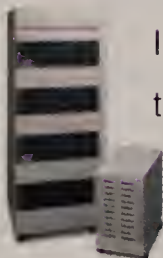
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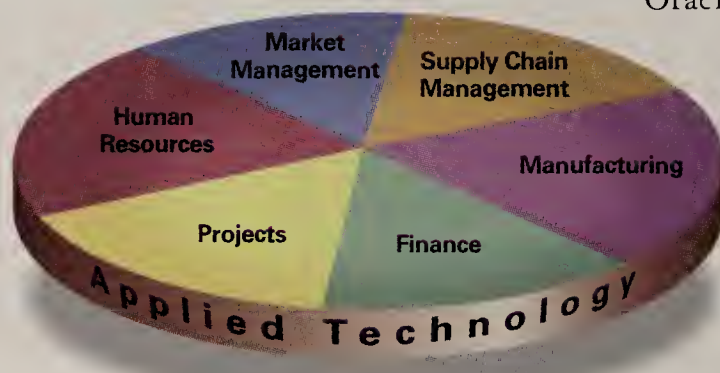
Alex Gray, Vice President of Corporate Operations

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